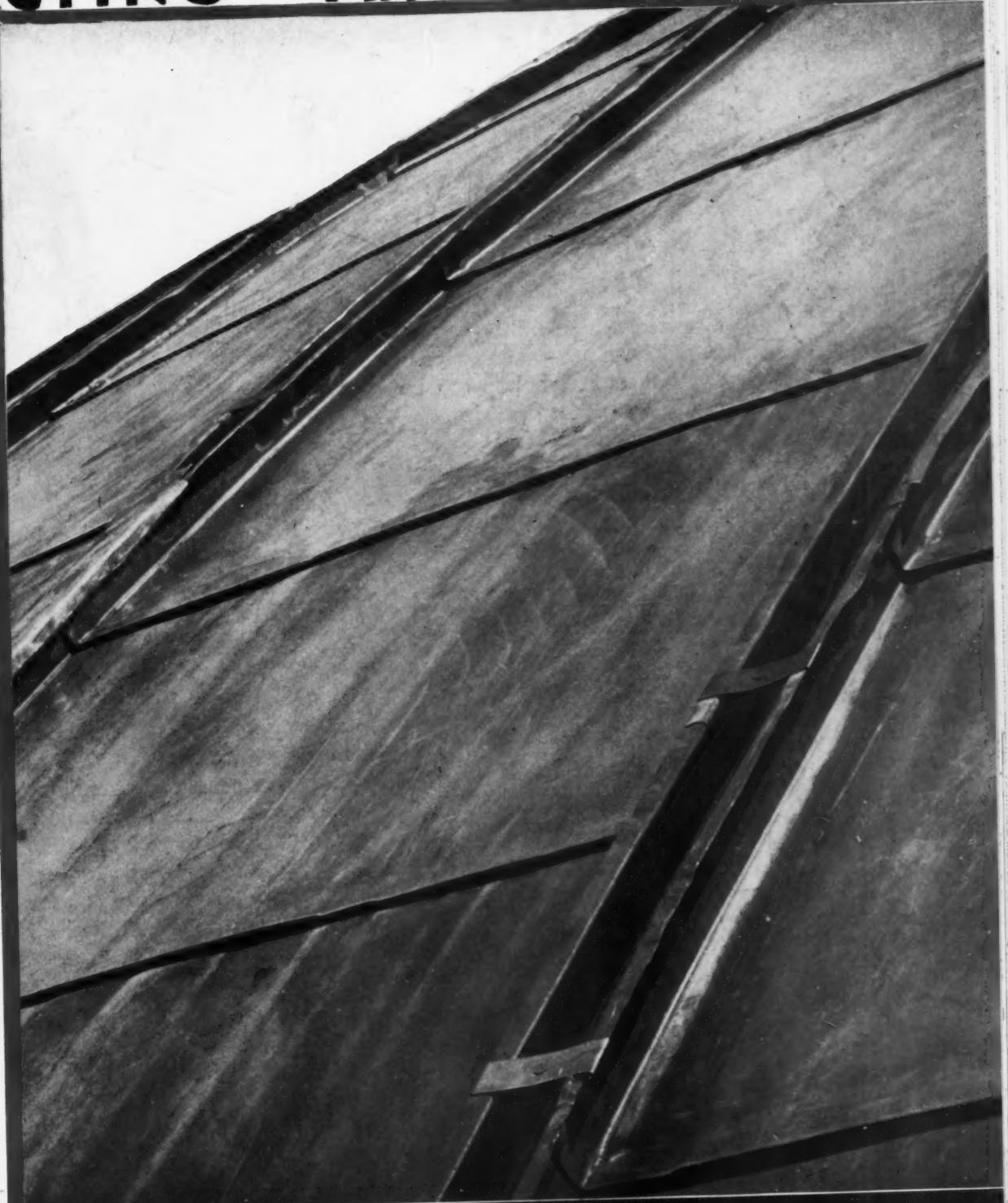


# AMERICAN ARTISAN

WARM AIR HEATING • SHEET METAL  
CONTRACTING • AIR CONDITIONING



ESTABLISHED  
8 8 0

SEPTEMBER  
1935

THE AIR CONDITIONING SECTION

Page 23

AMERICAN ARTISAN

# evidence

THAT SHEET METAL SHOPS  
CAN FABRICATE

**ENDURO**  
REPUBLIC'S PERFECTED STAINLESS  
AND HEAT-RESISTING STEELS  
Licensed under Chemical Foundation  
Patents Nos. 1316817 and 1339378.

The general public is fast becoming stainless steel conscious—a consciousness upon which every sheet metal shop can build new business and better profits by taking advantage of the buyer's abhorrence of that expensive destroyer—rust.

Any sheet metal product can be made of Republic ENDURO Stainless Steel. ENDURO can be bent, drawn, formed, punched, drilled, welded, soldered and worked

just the same as other sheet metal. The finished product will do the same work as though other ferrous sheet material had been used, with these added advantages. It will be more attractive in appearance. It will last practically forever. It will be easier to clean. It will mean the last word in sanitation.

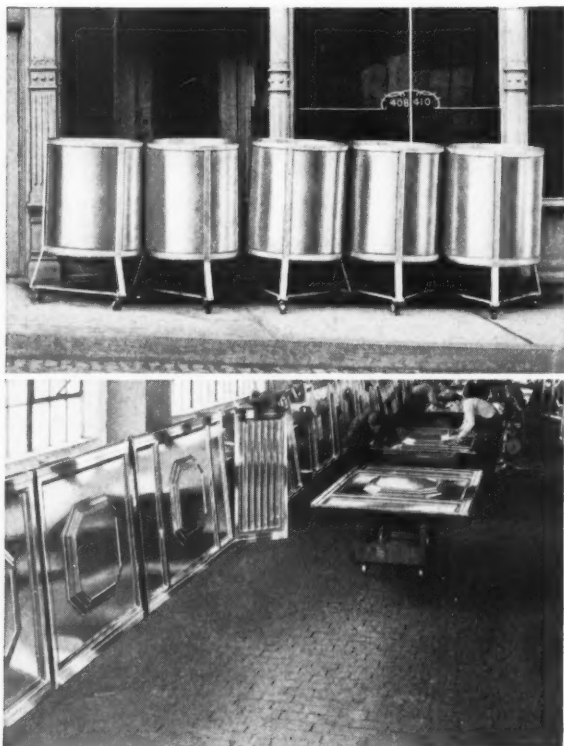
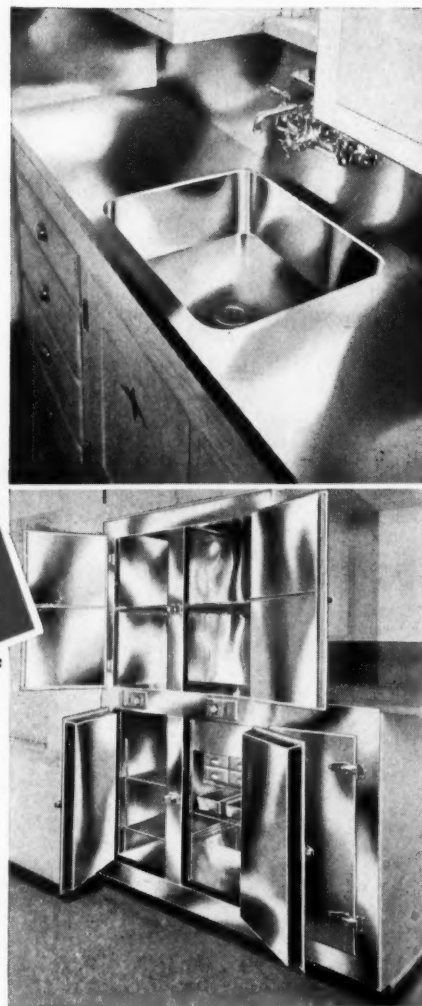
Let us send you complete information on this modern metal, so that you will be in a position to talk convincingly to the dozens of prospective users who look to you for suggestions on the right sheet metal for every application.



## Republic Steel

C O R P O R A T I O N

GENERAL OFFICES . . . YOUNGSTOWN, OHIO  
CENTRAL ALLOY DIVISION . . . MASSILLON, OHIO



# How to Make Money with **Furnace Regulators**

## DEALERS prefer to sell the **HOLD-HEET No. 1 Unit—**

the same equipment that is used and recommended by 59 of the 76 furnace manufacturers, for this De Luxe Equipment—the finest and the most powerful the market affords—has exclusive, necessary features that you cannot obtain with any other equipment.

**Only HOLD-HEET has Combustion Control — only HOLD-HEET provides these three necessary features.**

- 1. COMBUSTION CONTROL STOPS UP THE CHIMNEY WASTE**—Excessive stack temperatures mean "coal dollars" flying up the chimney. The HOLD-HEET Combustion Control in the stack closes the draft whenever stack temperature becomes excessive (wasteful).
- 2. COMBUSTION CONTROL PROTECTS YOUR HEATING PLANT**—90% of all heating equipment burns out—it does not wear out. Exclusive HOLD-HEET Combustion Control prevents this dangerous overheating.
- 3. COMBUSTION CONTROL PERVENTS OVER-RUNS**—The fire never gets out of control. It is quickly checked without over-runs of room temperature when the Room Thermostat closes the draft.

**This Sales Plan is a Winner -- for  
Everyone Profits, Especially the  
Purchaser.**

Pay your salesman for making the sale.....	<b>\$ 5.00</b>
Pay for installation—including a call back during the heating season to check adjustment and operation..	<b>5.00</b>
Estimated delivery cost.....	<b>.65</b>
Your net profit (almost 50% on cost).....	<b>8.00</b>
Your working margin.....	<b>\$18.65</b>
Your cost f.o.b. Chicago (direct or through your jobber) .....	<b>17.35</b>
Your selling price.....	<b>\$36.00</b>

You know a lot of young salesmen who would just eat up a proposition like this at \$5.00 per. These same calls will dig up a lot of profitable new furnace and repair jobs—but don't send them out "half-cocked." Equip them with a Demonstrator Set so they can really "close" sales—lots of them.

## **YOU ONLY INVEST \$1.00 in this sales plan.**

This is your cost for the Self-Seller Display Panel complete with wiring and miniature furnace doors all hooked up. This makes your cost of a complete Demonstrator \$18.35 (\$17.35 + \$1.00 = \$18.35). All standard units are employed and a full set of accessories is shipped with the Demonstrator Set so that you can dismount and make a regular installation at any time.

## **FREE Demonstrating Panel.**

When you order three Regulator Sets (3 × \$17.35 = \$52.05), one of them is mounted on the demonstrating panel without charge if requested. You can order a dozen sets and have four of them come as Demonstrators. Two hundred envelope stuffer cards ready for your rubber stamp will be supplied free with each Regulator Set.



**Let's get started right now  
—Here is an order form all  
ready for you to fill out.**

**RUSSELL ELECTRIC COMPANY**  
342 West Huron Street, Chicago, Illinois



This self-selling Demonstrator Set is supplied complete with cord and plug, as illustrated, all ready to demonstrate. The panel is 12" wide and 18" high. The Underwriters' Approved Transformer is mounted on the back and acts as an easel support on your counter where the public can see—and operate—and sell themselves through the Self-Seller Display Card on the side. A handle on the back enables convenient carrying to demonstrate in your prospect's home.

## **EFFECTIVE CIRCULARIZING HELPS.**

The small 3" x 5" index cards have been very effective. The new cards are printed in high grade, heavy, pink enameled stock—they will be kept. An installation diagram with actual halftone cuts of the units in place will enable the home owners to visualize this equipment in their own home. Use these cards freely, for they are effective. They are supplied free with regulator purchases (see order form).

## **ORDER COUPON**

Please Ship ☐ Express ☐ Freight ☐ Parcel Post ☐

**3** No. PU15P Regulator Sets, one of which is to be mounted on demonstrating panel without additional charge—3 × \$17.35 = **\$52.05**

...No. PU15P Regulator Sets complete @ **\$17.35**

...No. DPUI5P Demonstrator Sets complete @ **\$18.35**

☐ Send 200 free cards for each Regulator ordered.

Total amount of this order.....

Deduct 2% for cash with order.....

M.O. or check enclosed.....

(The cash discount is not deductible on c. o. d. shipments.)

Order direct or through your regular Jobber—all prices are f. o. b. Chicago.

Signed.....

Firm Name.....

Street.....

City.....

State.....



## IN THIS ISSUE

Large architectural sheet metal jobs are scarce enough, but hard lead applications are still scarcer. The fact that lead is such an enduring metal ought to lead to greater use. On page 14, the full details of one of the largest lead jobs of 1935.

This discussion of proper methods of baffling gravity casings when adding a fan begins to grow interesting. S. Konzo, from the Research Residence, adds some pertinent facts on page 16.

Did you like the article in August on flashing chimneys? On page 18 is a similar one on dormers. A full page of sketches are included for reference.

Licensing laws are blossoming in all parts of the country. The industry in Dayton, Ohio, have a law in operation. You can find the full ordinance for your use on page 21.

We haven't said much about the article by Professor Hoffman on insulation, but these articles have more meat than lots of flashier material published. On page 29 he discusses uninsulated attic floors—your greatest source of heat loss.

All summer a race has been going on to see which hotel would be first to be completely air conditioned. We are not judges, but the Maytag Hotel (of washing machine fame) must have been one of the first and we tell all about the job on page 30.

Our series on facts from the Research Residence continues to gain momentum. S. Kronzo in this issue explains all about Total Pressure. If you have been using the term (but wishing you knew what the thunder it really meant) you can find the answer on page 34.

The list of industries using air conditioning to stimulate processes, make money, or any one of a hundred other reasons, grows daily. On page 36 we find some orchid growers getting pricier flowers by feeding the plants conditioned air.

# AMERICAN ARTISAN

With which is merged

FURNACES  
SHEET METALS

AND

Warm-Air  
Heating

Covering All Activities in  
Gravity Warm Air Heating      Forced Warm Air Heating  
Sheet Metal Contracting      Ventilating  
Air Conditioning

J. D. Wilder, Editor

Vol. 104, No. 9    September, 1935    Founded 1880

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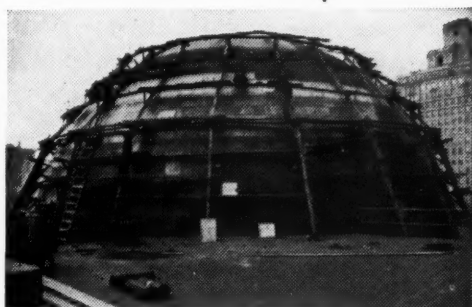
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**More than 7,000 Copies of this Issue are being distributed**

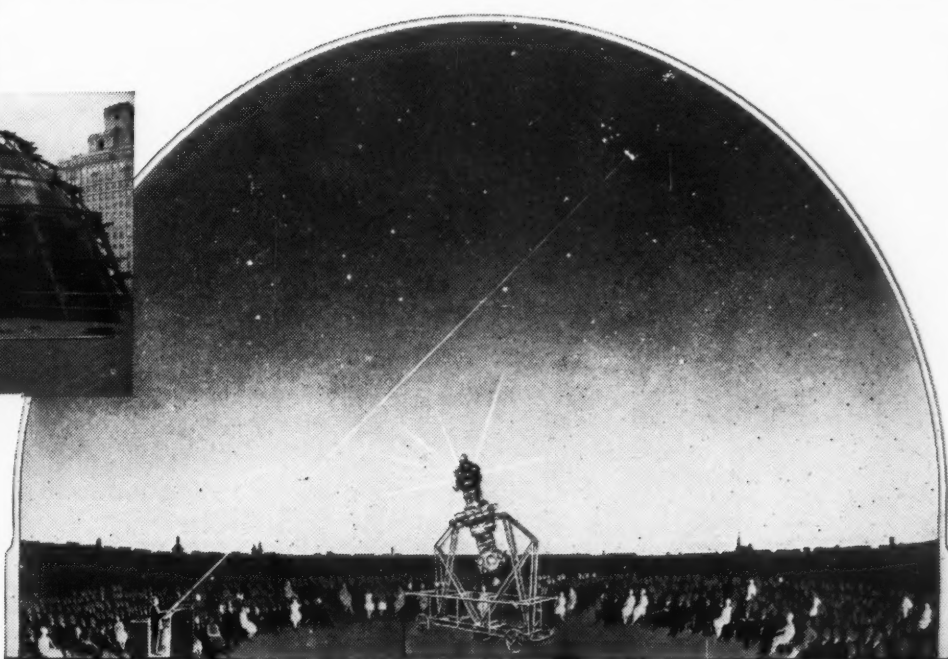


# Copper

*...on Heaven's Dome!*



Workmen covering the dome of Hayden Planetarium with Anaconda Copper. Jacob Ringle & Son, Inc., Jersey City—Sheet Metal Contractors. Trowbridge & Livingston, New York City—Architects.



Limitless space. That is the impression to be gained from the dome's interior surface, upon which the giant machine in foreground will project the map of the heavens.

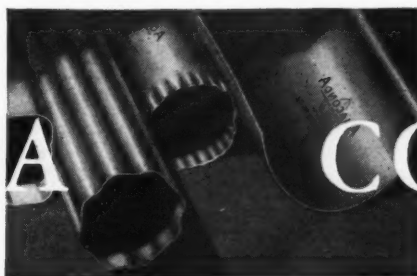
The dome of the Hayden Planetarium... now being completed for the Department of Astronomy of the American Museum of Natural History, New York City... is covered with copper. Approximately 13,500 lbs. of 18-oz. sheet copper... Anaconda Sheet Copper... were required for this unusual job. Each sheet... and there were some 4,000 of them... was edged in the shop, delivered to the job in bundles, flat-locked on the dome with cleats 8" on center.

Whether for an extraordinary planetarium or for replacing rusted sheet metal on a modest home, Anaconda Copper is accepted everywhere as the standard of quality. Leading sheet metal supply houses carry Anaconda Copper in sheets and rolls, and copper gutters, leaders, elbows and shoes trade-marked ANACONDA.

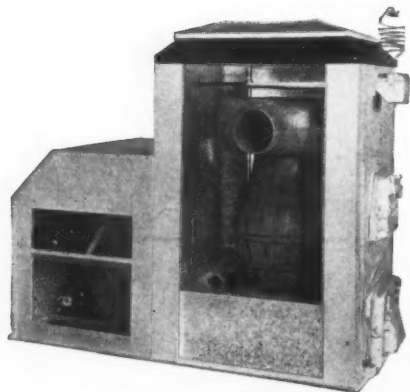
## THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Connecticut  
Offices and Agencies in Principal Cities

# ANACONDA COPPER



# MONCRIEF AND YOU...



**MONCRIEF ARISTOCRAT  
AIR CONDITIONING SYSTEM**

## Your Customers Are Ready for Air Conditioning

Everybody knows about air conditioning nowadays. Wants it in his home. Now, with returning prosperity, there is going to be a big sale of air conditioning systems and appliances.

Moncrief supplies everything to fill the air conditioning needs of homes and public buildings—Moncrief Gas Air Conditioning System is a de luxe unit of exceptional efficiency and economy—Moncrief Aristocrat Air Conditioning System for coal is likewise most modern in every particular.

### New MONCRIEF Aristocrat Oil-Fire Air-Conditioning System

Specially designed for oil burning, with extra large, long-fire-travel radiator. Takes any standard make oil burner. Handsomely finished in red and black crackle.



**MONCRIEF OIL FIRE  
AIR CONDITIONING SYSTEM**

Also made with vestibule enclosing oil burner and entire front.

### For Low Cost Air Conditioning

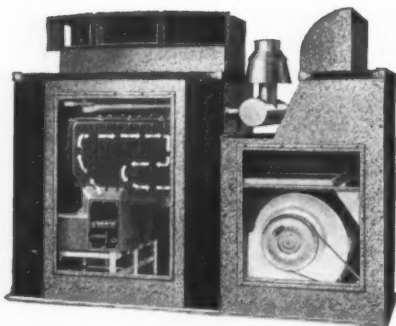
Three practical units for attaching to the home owner's present furnace . . . Moncrief Blower-Filter unit . . . Miles Junior Air Conditioner . . . Moncrief Automatic Humidifier. These give big value in air conditioning at very low cost.

### A New Line of Pipe and Fittings

Specially designed with lock joints for air conditioning installations. A complete line.

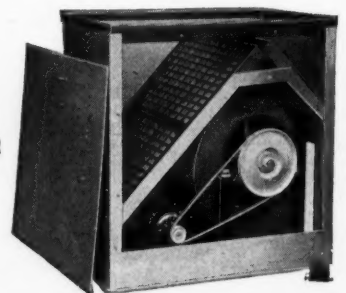
### Sales Help and Engineering Service

When you sell Moncrief, you have the advantage of a complete line. Further, you are supported by attractive sales helps and have the assistance of our Engineering Department, if you wish, in estimating and laying out jobs. Write for particulars.

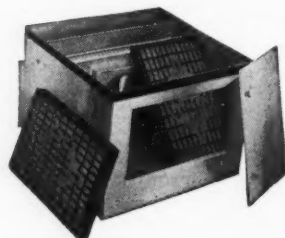


**MONCRIEF GAS  
AIR CONDITIONING SYSTEM**

**MONCRIEF  
BLOWER-FILTER  
UNIT**



**MILES JUNIOR  
AIR CONDITIONER**




---

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**We Supply Everything Used on a  
Warm Air Heating Job. Ask  
for Our Big Pipe and Fittings Book**

---

---

# ...a Partnership for Profit

**T**HERE is selling power in the name "Moncrief." For thirty-eight years it has stood for all that is best in warm air heating.

There is selling power in your name in proportion to the skill, the integrity and the energy you put into your business.

Add to your good name the fine reputation Moncrief has gained for making good heating equipment. You will have a combination which will make you the leading heating man of your section.

The Moncrief Proposition is designed to make money for you. It enables you to realize the most on your efforts. Write for particulars.

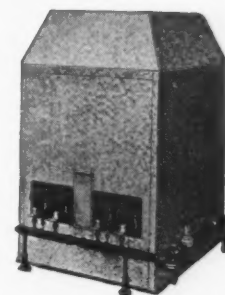
**THE HENRY FURNACE & FOUNDRY CO.**  
3473 E. 49th St. Cleveland, Ohio



MONCRIEF SERIES "C"  
CAST FURNACE



MONCRIEF SERIES "S"  
STEEL FURNACE



MONCRIEF  
SERIES "B"  
GAS FURNACE

**MONCRIEF Sales Helps  
for YOU—**



**Send Coupon for Details—**

The Henry Furnace & Foundry Co.  
3473 E. 49th St., Cleveland, Ohio

Send me descriptive literature and prices on the items checked below.

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> Series "C"<br>Cast Furnaces      | <input type="checkbox"/> Aristocrat Air<br>Conditioners              | <input type="checkbox"/> Series "B"<br>Gas Furnaces           |
| <input type="checkbox"/> Series "S"<br>Steel Furnaces     | <input type="checkbox"/> Aristocrat Oil<br>Fire Air Condi-<br>tioner | <input type="checkbox"/> Blower-Filter<br>Units               |
| <input type="checkbox"/> Gravity Job<br>Pipe and Fittings | <input type="checkbox"/> Air Conditioning<br>Pipe and Fittings       | <input type="checkbox"/> Moncrief<br>Automatic<br>Humidifiers |

Name .....

Address .....

City..... State.....



# GOHI

## PURE IRON-COPPER ALLOY

**S**HEET metal shops depend upon GOHI Pure Iron-Copper Alloy to give permanence to their skill and workmanship, because wear-, weather-, and corrosion-resisting GOHI is the longest-lasting, low-cost ferrous metal obtainable for every type of sheet metal construction . . . the one metal you can safely trust under all conditions.



*GOHI Pure Iron-Copper Alloy is available in all sizes and gauges. Produced exclusively by The Newport Rolling Mill Company, Newport, Kentucky.*

Made on the same unchanged formula for a quarter of a century, GOHI is homogeneous, soft, ductile; easy to shape, cut, stamp, bend, seam, draw or weld—the ideal metal for every sheet metal use.

Whatever your requirements, a sheet or a car-load, you'll find it to your advantage to use GOHI Pure Iron-Copper Alloy.

# GOHI

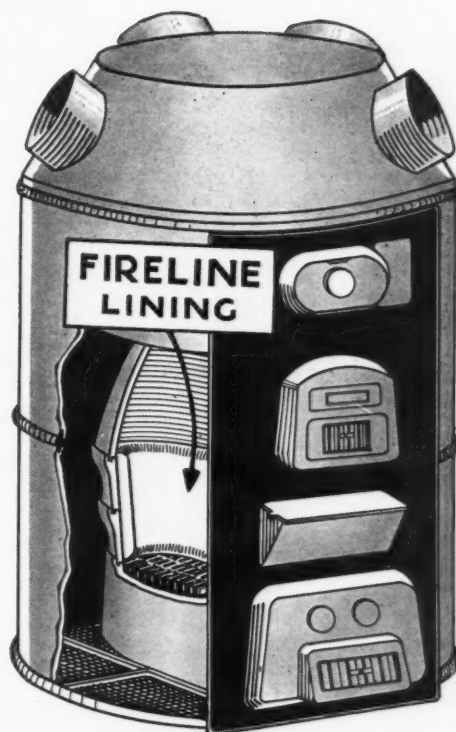
PRONOUNCED "GO-HIGH"

## SHEET METAL

THE NEWPORT ROLLING MILL COMPANY . . . NEWPORT, KENTUCKY

# Now is the time to **FIRELINE** all Furnaces

- to repair all cracked, broken and burned out fire pots, *without new castings . . . .* at low cost and high profit.
- to end burn-outs, increase furnace capacity, eliminate gas, smoke, soot and excessive ash . . . *to save fuel and cut heating costs.*



**FIRELINE** is a remarkable new discovery—a great sales opportunity. FIRELINE is a new refractory material—do not confuse with furnace cements—a genuine plastic firebrick of the type used to line high temperature industrial ovens.

**H**ERE IS the answer to the fire pot problem . . . a means of repairing cracked or broken firebowls immediately—without the delay for and high cost of new castings — without heatless days. Here is the answer to the “orphan” furnace and stove problems, the end of losses through obsolescence, a new and better type firebowl that fits all sizes, shapes and types of burners; that cuts costs to

customers, increases volume and profits for you.

## Eliminates Gas, Smoke, Soot, Reduces Ashes **SAVES FUEL**

FIRELINE raises combustion temperatures, reflects back heat from wall making a hotter, more uniform fire and eliminates low-temperature-combustion ring, the dark border you can see at the edge of any unlined fuel bed. It is from this “cooled” border that unburned gas, smoke and soot escapes. It is from this area that most incompletely burned “ashes” fall. With FIRELINE fuel burns red *from wall to wall*, burns hotter, burns far more completely. FIRELINE steps up the heat producing capacity of any burner, eliminates smoke soot, furnace gas and reduces ashes to less than 12% by weight (for coal). It ends the need for “ash sifting,” gives a cleaner fire. It gets more heat out of any fuel and cuts fuel bills as much as 15%.



Repair Cracked and broken firepots—90% of the times without taking down furnace.

Lasts indefinitely—is guaranteed not to crack, fuse or spall. Has strength to withstand ordinary erosion and poking.



**FIRELINE STOVE & FURNACE LINING CO., CHICAGO**

(Copyright 1935, Fireline Stove & Furnace Lining Co.)



## **FAR MORE SALES**

Surveys have shown that one out of every three fire pots is burned out. You know that very few will pay for new castings today . . . but furnace men are finding almost all are immediate prospects for FIRELINE, that costs so little, that pays a profit in fuel saved. FIRELINE every furnace, old and new, for economy, efficiency, convenience, and safety.

## **FAR More per Hour**

Coming in moist plastic form easily molded to any thickness by hand or with a small trowel, FIRELINE can be installed in the average furnace in less than an hour—pays around \$10.00 per hour for labor. It is the biggest market, biggest profit opportunity you have ever had. It is taking the country by storm.

NOW is the time—the season is on. It's time to cash in. Circulars, displays, newspaper mats are furnished to help you get started. Don't delay, send in the coupon today for full information and FREE SAMPLE.

### — FREE SAMPLE COUPON —

Fireline Stove & Furnace Lining Co.,  
1200 Clay Street, Chicago, U. S. A.

Dept. A-935

Gentlemen:

Send free information and Free Sample of FIRELINE with prices, discounts, installation data and description of your sales help.

Signed .....

Firm .....

Address .....

City .....

State .....

Name of Preferred Jobber .....

# As We Head Into America's Busiest Business Season in Years F. Meyer & Bro. Co. Say:



## Handy Pipe

is still America's standard of value in furnace pipe—including everything from boots to bonnets and from stack units to elbows and from cold-air to smoke pipe. Your orders will be filled promptly with this pipe that is "Built To Outlast The Buildings It Goes Into."

## Duct Work

Specially designed duct work for your simplest or most intricate forced-air jobs—duct work that enables you to install air-conditioning jobs with a finish and assurance of lasting satisfaction that ordinary piping cannot approach. If you haven't our Forced Air Duct Work Catalogue send for your free copy—it is a valuable aid in approaching the kind of jobs that are increasing.



## Syphon-Air Ventilators

The first REAL improvement in ventilators in years—just what the name implies. The wind blows in at the back and out at the front and sucks or "syphons" the foul air, gases, etc. out of the room below much faster than the air is removed by ordinary ventilators. Find out all about the SYPHON-AIR.

**FULL DETAILS GIVEN ON ALL THESE ITEMS ON REQUEST**

**F. MEYER & BRO. CO.**

**PEORIA**

**ILLINOIS**





Photo courtesy of T. F. Leeson Co., Detroit, Mich.

**N**OW you can really get the big profits arc welding offers! No longer is it necessary to waste time and money on obsolete methods of welding.

Today, thanks to the new Lincoln welder you can do all kinds of welding with one machine. You don't need to pass up certain jobs and let the profits go to others. You can weld any metal! Sheet metal—as light as 24-gauge—is welded easily. Also galvanized iron, stainless steel, copper, aluminum. Even heavier materials such as angle iron, plate and other shapes.

Welding was never so easy! All you do is connect one of these new Lincoln welders to your power line, push the switch and start welding. And in everything you weld, you get the high quality welds and high welding speeds you need for lowest welding costs.



**LAD** "Why be down in the mouth about things—it's a simple matter to get your face lifted."

**POP** "But the trouble is to keep it that way when you read the news out of Washington. I wish they could give us permanence to any face lift, the way the new Lincoln SA 75 gives it to savings on sheet metal welding."

Why go on bothering with old-fashioned equipment... with buckling and warping... with wasting heat and paying rent on containers when you aren't using the materials they contain? Is it worth it when you can get one of these new money-making welders for as little as \$250?

Find out how much easier, how much better and how much cheaper you can weld with this new Lincoln welder. No other piece of equipment offers you such big profit opportunities for such a small investment. For particulars, address THE LINCOLN ELECTRIC CO., Dept. EE-172, CLEVELAND, OHIO. Largest Manufacturers of Arc Welding Equipment in the World. Mail the coupon today.

**THE LINCOLN ELECTRIC COMPANY**  
Dept. EE-172, Cleveland, Ohio

Gentlemen: Please send me full particulars  
on the new Lincoln arc welder.

Firm.....

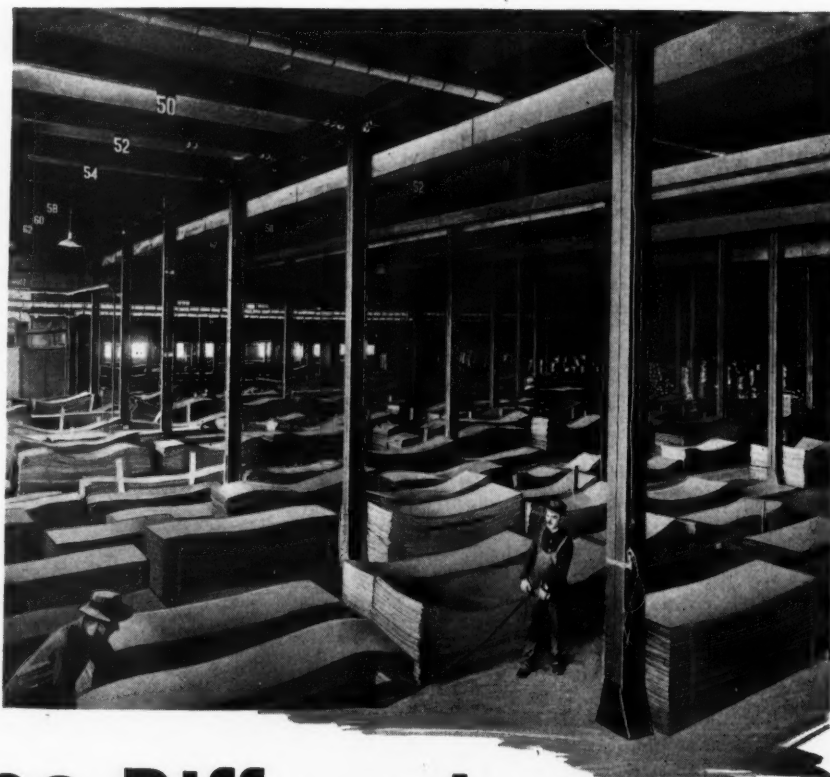
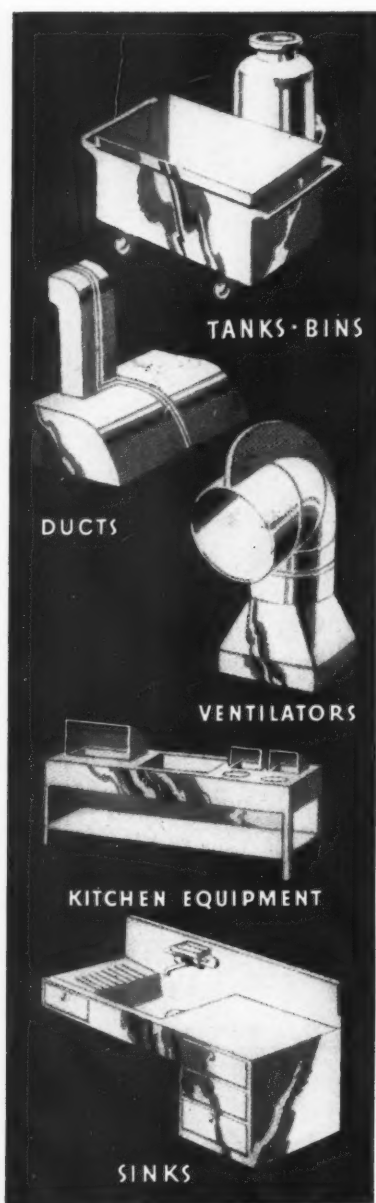
Your Name..... Title.....

Address.....

City..... State.....

## Get New Business with Allegheny Stainless

Allegheny Time Tested Stainless Steel opens new fields to the sheet metal men. Unrusting, unstaining, untarnishing — yet ductile, easy working and strong. When you need Stainless specify Allegheny Metal. In stock at all Ryerson Plants. Immediate Shipment.



## 28 Different Kinds of Sheets

### In Stock for Immediate Shipment

*Making it Easy to Select the  
Right Sheet for Every Purpose*

Select the best sheet for each particular job. You can get it immediately from the nearest Ryerson plant. In addition to the wide range of steel sheets, copper, brass and other non-ferrous metals are also in stock. One order can cover the majority of requirements — from sheets, angles, rivets, bolts, welding rod, etc., to sheet metal working tools. Combine your orders and save office work, time, trouble and money.

The Ryerson Stock List is your guide to immediate steel. If you haven't the current copy, we will be glad to send it.

#### PARTIAL LIST OF SHEETS CARRIED IN STOCK

Abrasion Resisting	Electrical	Locomotive Jacket
Allegheny Stainless Steel	Enameling	Long Terme
Armco Ingot Iron	Eraydo	Perforated
Blue Annealed	Galvanized	Radio Transformer
Bullet Proof	Panel & Sign	Stretcher Levelled
Copper Bearing	Galvannealed	Tool Steel
Corrugated	Heavy Hot Rolled	Uniform Blue
Deep Drawing	High Carbon	Vitreous Enameling
Dynamo	Hot Rolled, Annealed	Wellsville Polished

JOSEPH T. RYERSON & SON, Inc.—CHICAGO—MILWAUKEE—ST. LOUIS—CINCINNATI  
—DETROIT—CLEVELAND—BUFFALO—PHILADELPHIA—BOSTON—JERSEY CITY

# RYERSON

## STEEL - SERVICE

Volume 104



Number 9

## AMERICAN ARTISAN

### Amateurs in Heating

An item recently called to our attention related the experience of a home owner who in good faith purchased a forced air heating system from a specialty sales organization whose sole qualification as a heating expert consisted of several years selling refrigerators and radios. A new and untried manufacturer of air conditioning apparatus (not an established furnace manufacturer) needing an outlet for its goods in this town and not finding any established furnace dealer interested in its proposition had appointed this sales agency as distributor.

Investigation discloses that this manufacturer had assured the agency that heating experience was not needed. What the manufacturer really wanted was an outlet.

The sum total of assistance given the sales agency by the manufacturer consisted of some beautifully colored literature, some window posters, one display unit and its best wishes. The agency was given to understand that engineering would be promptly and well taken care of by the manufacturer's engineering department. The agency, not appreciating that distant engineering departments can seldom advise on the hundred and one small details any good heating man solves as a matter of course, blindly accepted the agency and went forth to extol the virtues of the "Whosis" air conditioner.

The installation referred to us for comment was the agency's first important job. In a new house, with an owner who would willingly have made every change in order to get a first class job, the resulting installation has just about everything possible wrong with it. The furnace possesses no extra capacity. The blower has a listed free air delivery, but a questionable delivery against resistance. The ducts change from flat to square and back again, twist and turn like a pretzel, registers are mostly in the worst possible location and serious errors have been made in the heat loss calculations.

True, the plan was engineered by the manufacturer's engineering department, but even a high class engineer (which this department certainly was not) could not have deduced facts any heating man would have emphasized in reporting on the house.

The net result of the whole project is that the

owner—an influential person in the community—is condemning forced air heating, air conditioning and all its handmaidens. The sales agency is disillusioned and disheartened, while every heating man in the community for months to come will find this installation thrown in his face.

We believe that this hoggish shortsighted policy on the part of manufacturers cannot be condemned too strongly. It is a shortsighted policy to say the least; while to speak plainly that manufacturer ought to be black listed by everyone interested in heating.

So far as we can judge this problem is appearing in communities all over the country. There is nothing basically wrong with sales agencies as heating dealers, but there is certainly everything wrong with sending forth such agencies totally unprepared for the problems encountered on every job.

We, as a tried industry, know that there is no short path to heating knowledge. The best organization in the world can't make heating experts out of themselves by reading mail box stuffers or brightly printed display cards. Heating knowledge must be painfully threshed from chaff and grain. Books are not sufficient. Practical work is not sufficient. Two weeks short courses are not sufficient.

Months and years of study, work, observation are needed.

Observation of what happens in communities facing this condition seems to indicate that hope and prayer will be useless in keeping amateurs out of our industry. Legislation, likewise, is useless, for most examinations are pretty sketchy affairs today. The only weapon seems to be a good and growing list of satisfied users of our services, jobs of all kinds which operate satisfactorily, and a reputation for knowing our business. We admit that reputation often falls down when most needed. Nevertheless, within our observation reputation is still the only weapon available. What do you think?

### Into Another Winter

Reports from many parts of the country state that the heating business this fall is far better than any fall of the last four or five years. Repair work, service calls, remodeling, even

new installation is showing unusual activity. Contractors are busy, many are getting more work than the shop has handled in several months' time.

The chief gainer seemingly is the small job shop. Repairs to heating plants, repairs to gutters, and general sheet metal work, as well as roofing, are being ordered and let to contract in a volume which is highly encouraging. The large shop, on the other hand, is still stumbling along, barely keeping out of the red and wondering from week to week what will turn up to keep the doors open.

We have seen personally any number of large shops during the last few weeks just barely able to get in enough work to keep the office open. The only busy spot is the estimator's office and he isn't getting anywhere because work is going at ruinous prices.

It would seem as though the small shop will likely come through the winter in pretty good shape, but the future of the large shop is still in doubt.



# Fabricating and Erecting Methods for A Hard Lead Dome



**I**N Rahway, New Jersey, the Edwin R. Huddy & Sons Company is now completing what is said to be one of the three largest lead covered dome projects in the country. The dome, located on the state reformatory main building, is almost 400 feet in circumference, 125 feet in diameter and about 42 feet high. Originally built in 1896 and covered with tile and metal, the old materials are being entirely removed and replaced with hard lead.

In general design the dome consists of a series of three steps around the base, starting above the main cornice, a batten type, round dome topped by a skylight 26 feet in diameter. The lead work extends from the lower riser of the lowest step to the bottom of the glass of the circular skylight. Material used is identical throughout, being 3-pound

hard lead sheeting containing approximately 7.5 per cent of antimony, which practically doubles the tensile strength of the lead. The sheets used have a thickness of  $\frac{3}{8}$  inch and weighed a little more than 300 pounds per square.

## General Procedure

Due to the particular design and size of the dome and the amount of work involved, the Huddy company worked out a number of interesting shop and field methods. As shown in the drawings and photographs, the battens are 4 feet apart at the bottom of the dome (just above the steps) and one foot apart at the base of the skylight. The requirements were for staggered horizontal seams, which meant that sheets in adjoining bays were not identical in shape or form.

The contractor made two sets of galvanized iron templates, one template set for each bay, from measurements made on the job and from the original drawings. One set of templates were marked

in sequence from the bottom up in numbers; the other marked with letters. The templates were cut to allow for the two turned up side edges and the bottom and top turned, locking edges.

In order to save time and labor these templates were sent to the lead factory, where the sheets were fabricated and cut to size according to the templates, and were then numbered or lettered to correspond to the template section.

## Field Fabrication

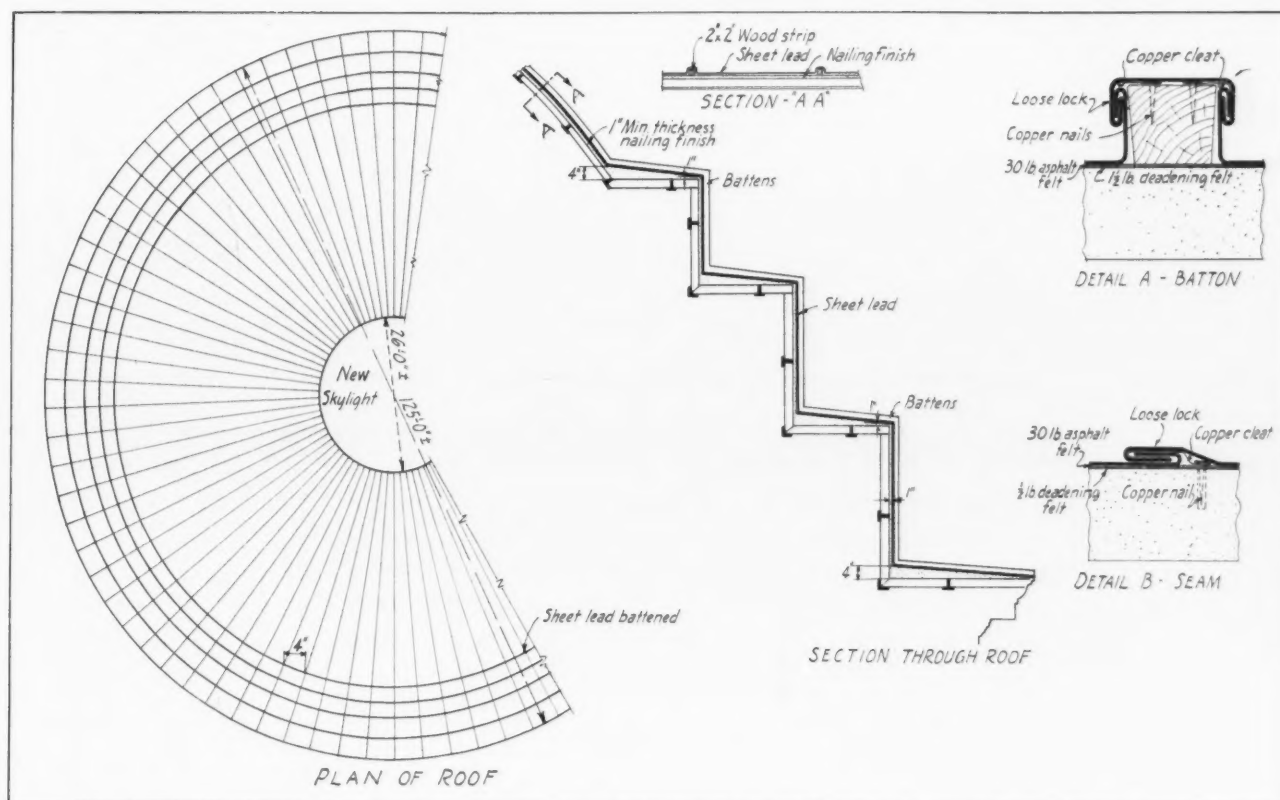
With the sheets cut and marked by the factory, the contractor still had to turn up the side edges  $2\frac{1}{2}$  inches plus another  $\frac{1}{2}$  inch for turn over for locking with the batten cap, turn up and over the top edge and turn down and back the bottom edge each  $1\frac{1}{2}$  inches and cut out the notches. The necessary cutting tools and a brake were installed in a field shop. The brake was set to accommodate the  $\frac{3}{8}$ -inch thickness of the sheet and a rounded nose was used so



**Left**—The steps at the base of the dome are covered with hard lead with the roof battens continuing down the treads and risers. Note the wood battens, copper cleats and seam along step edge.

**Right**—The dome and steps were first covered with two layers of felt. Battens were fastened down with bolts. Sheets for the tread of the top step were cut long enough to bring the seam up on the dome.





that no bend would be sharp enough to cause a break in the metal. The edges were turned up short of the true distance between battens to allow approximately  $\frac{1}{4}$  inch on each side for expansion.

To erect the sheets, a procedure was worked out in which the sheets were stored on the ground and the ground man provided with a light wood template of the two bays. The sheets for one bay were then selected from stock and temporarily assembled in the ground bay and sent to the roof as an assembled group of sheets.

On the dome the workmen passed a 1-inch rope three times around the base of the skylight for an anchor and from this anchor dropped ropes down the dome to which were attached the 1x2-inch fir cleat ladders. As an extra precaution, guy ropes were also dropped alongside the ladders.

The roof is batten type, with the battens carried over the step and down the step risers. Battens are spaced about 4 feet apart at the base of the dome and are fastened to the roof by toggle bolts passing through the roof surface

and bolted on the underside. Battens are made from 2x2-inch timber, creosoted and tapered inward slightly at the bottom and with upper corners rounded. The roof surface was covered with a lining of 30-pound asphalt felt and an underlining of  $1\frac{1}{2}$ -pound deadening felt to form a cushion for the sheet lead.

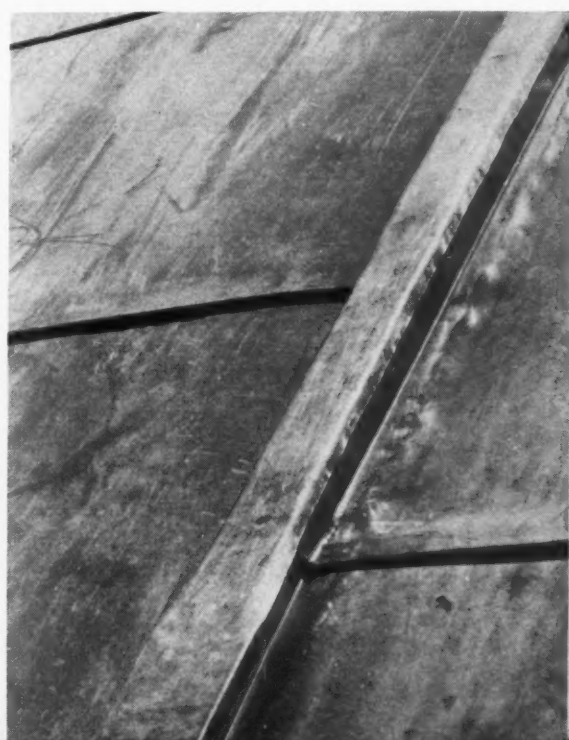
When a group of sheets for a bay were assembled on the ground, the sheets were sent to the roof, where they were fastened along the upper edges with

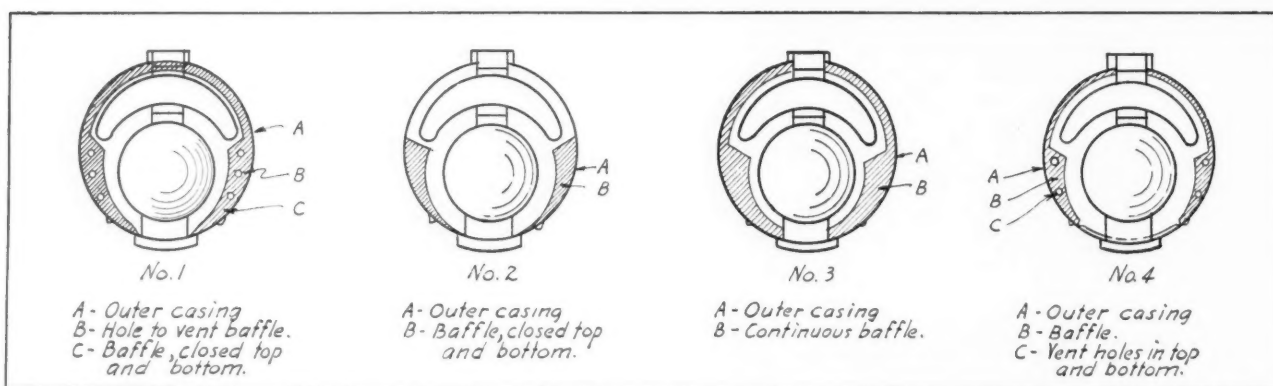
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Top—Various details of the dome construction showing plan and section. Also construction of a typical batten and horizontal pan seams.

Left—In forming the pan sheets the brake was set for the extra thickness of the lead sheet. No bend was made sharp enough to cause a break in the metal. The operator is E. R. Huddy, Jr., contractor.

Right—Closeup of a batten showing formation of pan sheets, the 8-foot cap which was not locked horizontally and the horizontal pan sheet seams. Waterproofing compound was used in all joints—but no solder was employed.





## Some Suggested Baffling Practices

In the July and August issues we published recommendations for converting gravity casings to forced air flow. S. Konzo writes that the University of Illinois Research staff has gathered some data which may be of value. This article covers facts previously published in research bulletins.

By S. Konzo

Special Research Associate,  
University of Illinois

IN the July and August issues of the AMERICAN ARTISAN an article entitled "Some Suggested Baffling Practices" presented various diagrams for the baffling of furnaces that showed how some manufacturers were making provisions to obtain the maximum heat transfer from the heated surfaces of a furnace in the case of a forced-air heating system.

It has been recognized that the casing of a warm-air furnace that is adapted for a gravity warm-air installation is usually too large for a forced-air installation. The wide open spaces between the furnace and the casing, which are required for gravity circulation, allow the cool air to "sneak" by the heated surfaces without getting into contact with the hot surfaces. The necessity for proper baffling is clearly indicated.

In general, the present methods of baffling a furnace of a given type are quite similar in nature, as illustrated by the diagrams in Fig. 1. The figure is reproduced from the July article and shows the methods of baffling a crescent-radiator steel furnace.

### Flow at Casing Entry

The writer wishes to add his comments on the same subject, particularly with reference to the air flow that takes place within the casing. In this connection the diagram shown in Fig. 2 for

a booster-fan installation in a gravity, warm-air system is worthy of careful study by installers and manufacturers alike. This diagram, which is reproduced from the University of Illinois Engineering Experiment Station Bulletin 246, shows the air circulation at the outlet of a propeller fan placed in the boot of the cold-air shoe. The arrows indicate the actual direction of the air circulation as determined during a test, and the shaded lines

represent the dead-air zones where the movement of the air was not definitely in any single direction. The dead-air zones are the zones of turbulence where the air is simply churning around, and correspond to the back-waters in a swiftly moving stream of water.

The dead-air zone of greatest interest is that located directly above the air entry to the casing. In most installations in which the fan outlet is located at the rear of the furnace, the dead-air zone is located at the back end of the furnace near the firepot. It should also be noted that the main air stream from the fan tends to flow towards the front of the furnace casing. However, the front part

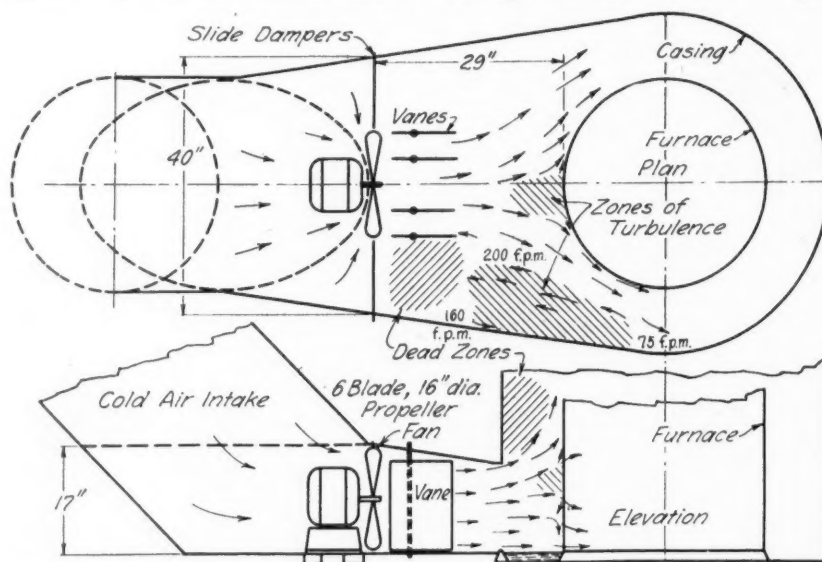


Fig. 2—Diagram of air circulation in cold air shoe with a propeller type fan showing areas where air flow is "dead" resulting in unknown air temperature in leaders taken off above "dead" zones.



of the furnace has a good deal of heating surface that is relatively ineffective as compared with other heating surfaces.

For instance, the top of the ash-pit and the sides and top of the feed neck are relatively cold as compared with the surfaces on the firepot, combustion chamber and radiator.

#### Forced-Air Installations

To a great extent the conditions shown in Fig. 2 for a booster fan installation apply equally well to a blower installation. It may be observed in Fig. 3 that there is a tendency for the air to be delivered to the front of the furnace, where the coldest heating surfaces are located.

These unfavorable conditions are particularly noticeable in the case of an unbaffled casing used in a forced-air installation. Even a casual survey of the furnace casing with the bare hand will indicate that the casing may be quite cool to the touch in the front, but may be very hot to the touch in the back of the casing. It should be recognized that the casing becomes hot at any portion because sufficient air is not passing over the heated surfaces inside of the casing to carry away the heat. In fact, an unbaffled furnace casing, or an improperly baffled furnace casing will nearly always show the presence of these "hot spots" on the casing.

The conditions are greatly im-

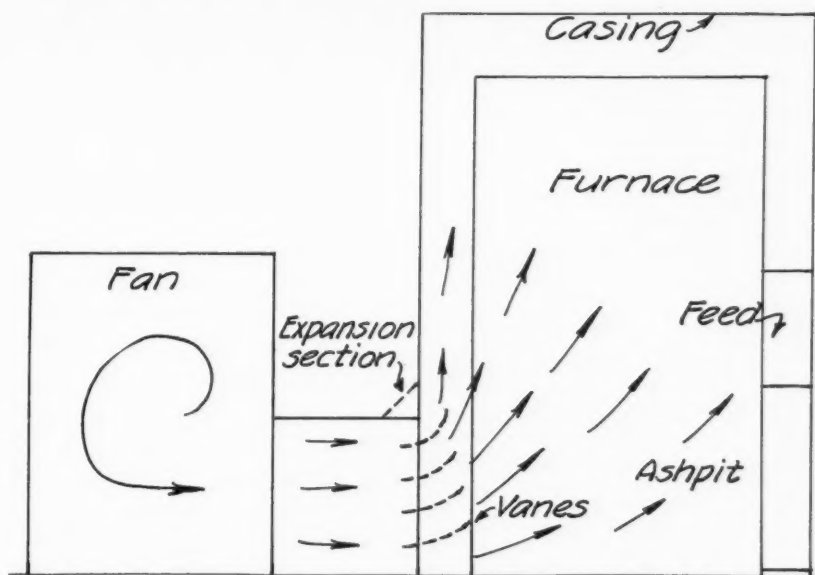


Fig. 4—Suggested use of turning vanes to force the air to flow up the rear of the furnace casing.

#### Equalizing the Flow

The conditions illustrated in Fig. 2 also exist to a lesser degree in the case of a baffled furnace. Frequently not enough air is forced to flow up the rear of the furnace, with the consequence that the casing feels warmer to the touch of the hand at that spot than it does at the front.

The author suggests, in the light of the preceding discussion, the possible use of deflector vanes, such as that shown in the diagram in Fig. 4. Such vanes would insure the positive delivery of a certain portion of the air from the fan to flow up the rear section of the furnace. Such deflecting vanes should have a large radius of curvature in order to minimize the frictional resistance to air flow. Furthermore, the vanes should be designed and installed to meet the needs of the particular type of furnace under consideration.

#### Method of Observation

Studies of air flow made on the drawing board to indicate the manner in which the air stream should flow through a casing may be greatly misleading. It is recommended that the installer or manufacturer should study his "baffling" problem with the furnace actually under operation. In order to do this the casing should be cut open at a level near the

(Continued on page 76)

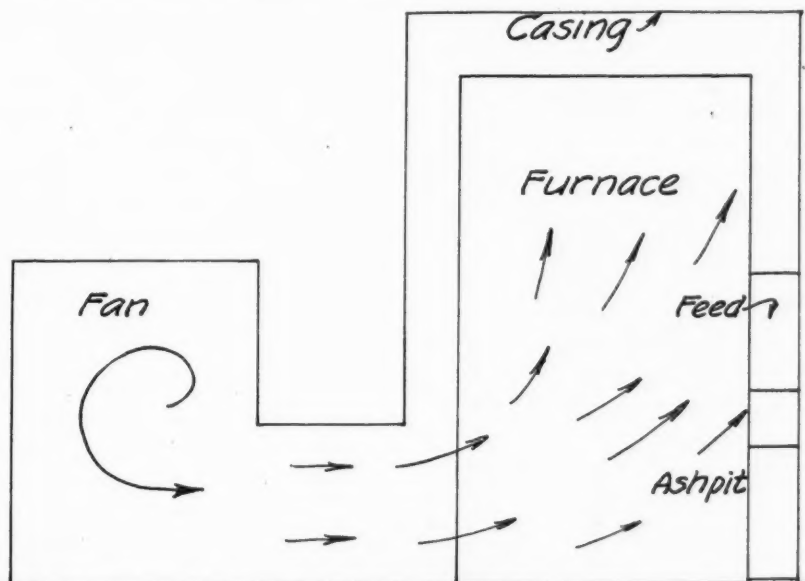


Fig. 3—The air has a tendency to flow to the front of the furnace where the heat-surfaces are relatively cold.

## Better Weather Protection

**D**ORMER windows which cut through sloping roofs present a source of roof leakage which only intelligent and adequate flashing can prevent. Whether the roofing material be metal, slate, composition or any other material the problem is to so catch and direct the water that no chance is afforded for water to stand around the dormer.

On the facing page we present a series of sketches showing dormers cut through sloping roofs where the dormers are built of different materials.

It may be said that basically dormer flashing is all pretty much alike—we must apply adequate flashing at the point where the dormer roof enters the main roof. The trough so formed at the roof must be continued down the sides of the dormer and away from the dormer base.

### Shingle Dormer

The flashing for a dormer window covered with shingles is shown in Fig. 1. Flashing sheets should be so placed that each sheet will lap the sheet below at least 2 inches and be separated by one shingle thickness. Flashing sheets should extend up the cheek walls at least 4 inches and be nailed close to the top edge with one or two copper nails.

When properly constructed this type of shingle dormer will show no flashing along the top or cheeks—only below the sill. The flashing sheets below the window sill should lap over the shingles at least 4 inches and care should be taken to see that each sheet extends above the shingle on which it rests so it may be nailed without puncturing the shingle.

Fig. 2 shows a detail of the proper application of cheek flashing along the base of a stucco covered dormer wall. Attention is called to the use of base flashing sheets so placed between slate that only a very short space about the center of the flashing section shows only one thickness of copper flashing.

The cap flashing of the cheek wall is placed behind the metal

A series of illustrated reference sheets selected from recommended practices in use in the industry. The facing page shows details of the methods for flashing dormers on roofs of several kinds of materials. Emphasis is given the minor details often overlooked.

lath of the stucco about  $3\frac{1}{2}$  inches and nailed into the sheathing along the top edge. A separate molding board is recommended so that the cap flashing is turned out into a step before it reaches the top of the base flashing.

Fig. 3 shows a larger detail of flashing for a stucco covered dormer. The flashing where the roof pierces the main roof is the same as Fig. 1. Where a metal cornice or molding is used along the top of the cheek the stucco should be placed in a groove in the cornice so that there is metal behind and outside the top edge of the stucco. The flashing below the sill is the same as Fig. 1.

### Metal Dormer

Fig. 4 shows a metal dormer where the cornice, cheeks, moldings and face are metal clad. In this installation the cap flashing of the cheeks is really the lower edge of the cheek panel. (Fig. 6.) The base flashing is identical with that shown in Fig. 3. The cornice should be preformed ready for erection and as nearly in one piece as possible. The cornice is placed under the dormer roof shingles and carried down to loose lock with the cheek panel—if possible as one piece. (Fig. 5.)

The construction of the metal dormer face will vary greatly, depending on the contractor and design, but the sill should be covered separately and formed to provide a drip along the lower edge. The sill flashing sheet is locked into the drip along the top. The flashing should overlap the shingles at least 4 inches.

Fig. 5 shows a detail of the suggested connection between the

sheet metal cornice and cheek panel of the metal clad dormer already described for Fig. 4. Note the use of a one-piece cornice and the connection between cornice and cheek. Two drips are thus formed.

In Fig. 6 the detail of connection between metal cheek and base flashing is clearly shown. The cap flashing in this case is the lower edge of the cheek panel, again carried out in a step as explained for Fig. 2.

### Recessed Dormer

In Fig. 7 is shown details of flashing for dormers having a recess in front of the face. This particular drawing shows a copper roof formed in flat seams and fastened along the edges by means of brass edge strips over which the copper is hooked.

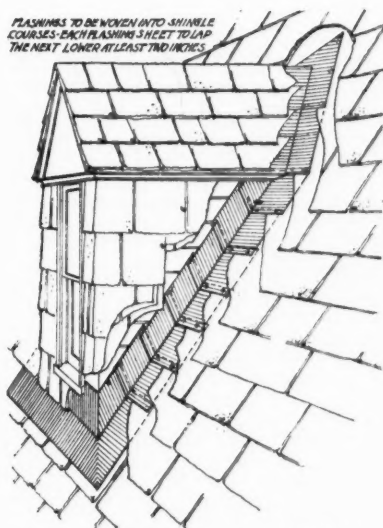
The flashing along the dormer roof is carried back under the shingles so that at least 4 inches of flashing are under the shingles and at least two thicknesses of shingles are over the copper. The flashing along the cheeks is identical with that described for Figs. 1 and 3.

The copper sill apron outside the recess should extend over the shingles at least 4 inches and should be turned under  $\frac{1}{2}$  inch for stiffness. The corner flashing shingles should be soldered to the apron with lap seams as shown.

The recess deck is covered with copper sheets laid flat seam. At the window a copper flashing strip should extend completely through under the sill and be locked and soldered to the deck copper. At the bottom a copper apron locks to the lower edge of the deck and extends over the shingles at least 4 inches. Where several sheets are required for the bottom of the deck all sheets should be locked and soldered. The sides of the recess are covered by a two-piece base and top as shown with the lower edge always soldered and the top edge soldered where water may stand.

The top edge of the side sheets is turned back under the shingles at least 2 inches and cleated.

## • DORMERS •



BUILT IN BASE FLASHING FOR DORMER WINDOW ON SHINGLE ROOF

Fig. 1

Where dormers are cut through sloping roofs like this, flashing must provide a channel for water so that no water is allowed to stand around the dormer long enough to work under the shingles.

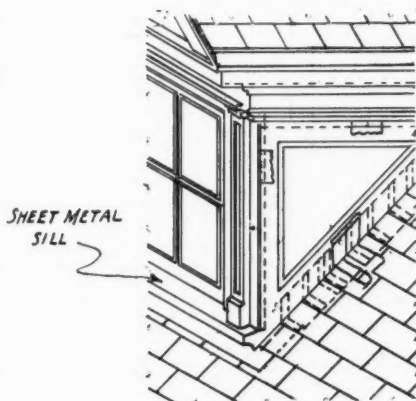


Fig. 4

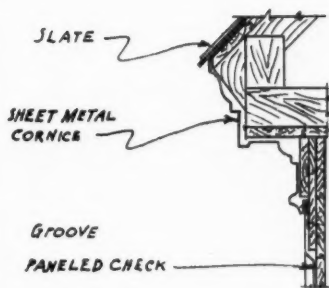


Fig. 5

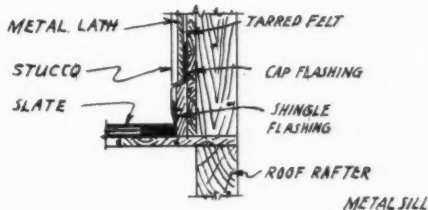


Fig. 2

At stucco covered cheeks a molding board should be used to "step out" the cap flashing as shown here. Also flashing sheets under the shingles should be so lapped that there is two layers of metal under most of the shingles of the roof. Stucco must be flashed correctly for it absorbs water.

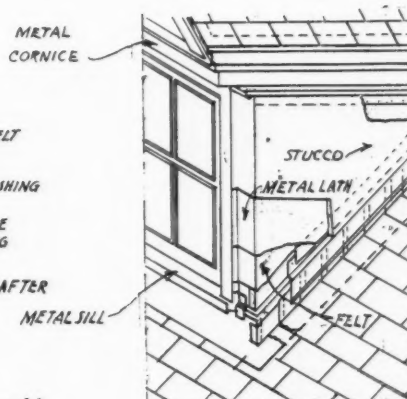


Fig. 3

Drawing showing general arrangement of flashing along the bottom of the cheek of a stucco covered dormer. The stucco top edge should be set into a groove in the cornice so that there is metal behind and outside the top edge.

Below—Flashing methods for recessed dormer. The method of locking and soldering deck sheets is shown. For full explanation of the recommended methods of insuring water tightness in a dormer of this type see the accompanying text.

Left—Detail of an all-metal dormer showing general arrangement of flashing along bottom edge of cheek and beneath the sill.

At left, below—Detail of connection between cornice and cheek of an all-metal dormer showing formation of two drips and use of a one-piece cornice. Below—Detail of lower cheek showing use of cheek panel as cap flashing.

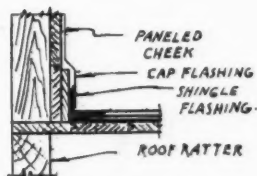
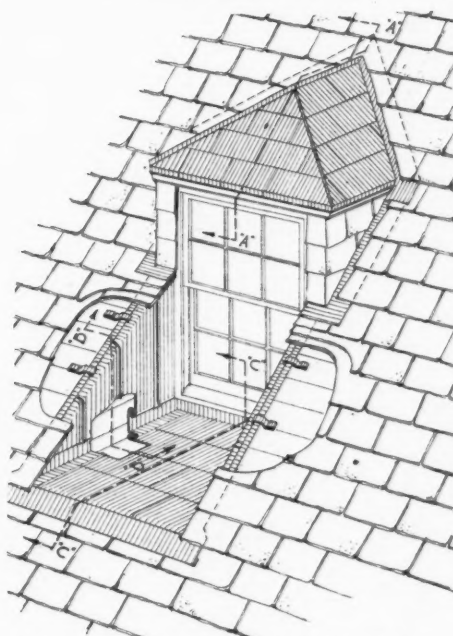


Fig. 6



FLASHING FOR A RECESSED DORMER WINDOW

Fig. 7



# Exhaust Design for Toxic Fumes

By J. W. Baybutt

Instructor, Rochester Athenaeum  
and Mechanics Institute

SOME time ago the writer had occasion to check the proposals submitted by several sheet metal contractors for the ventilation of a room in which a toxic fume was generated. It was interesting to note the wide variation in amounts of air which the contractors recommended for the adequate handling of the amount of fumes given off, but they all seemed to agree that a propeller type fan, located in the outside wall, was the best method of approach. The fan sizes varied from an 18-inch diameter to a 35-inch, the air volumes ranging from 2300 C.F.M. to 6900 C.F.M.

Fig. 1 is typical of the room layout with the fan shown in the location generally suggested, although one concern favored placing the fan in the extreme north-east corner of the room. The air changes with these size fans would vary from about 29 per hour to 86.

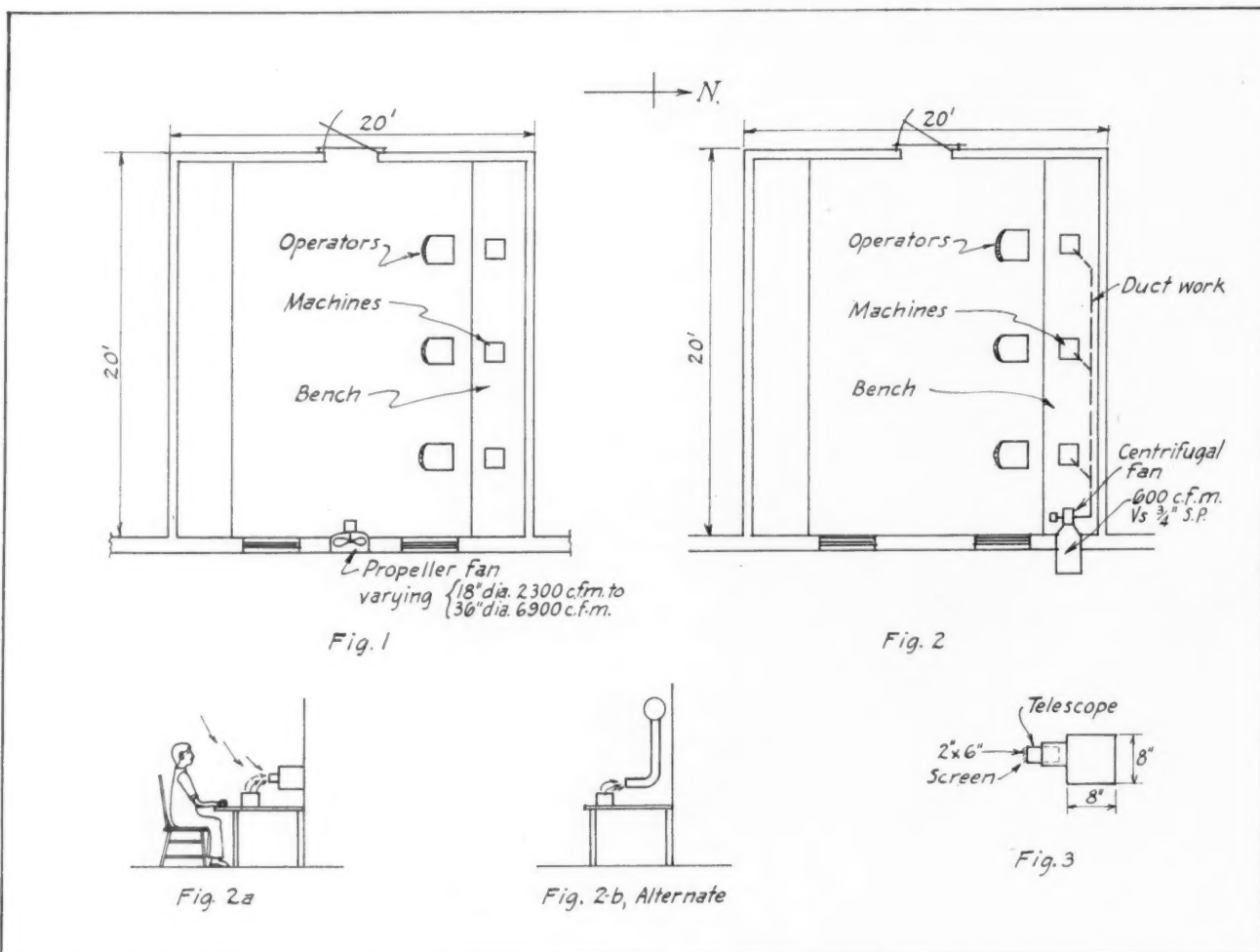
Let us look at the possible effectiveness of the propeller fan method on this job. The fume is given off in three places on the bench with the operator sitting as shown, noted by circle. The fan is handling air and assumedly this air leaks in through the west door from an adjoining room, especially in the winter time when the windows would be closed. This air then passes directly across the room to the fan, with little or no effect on the air motion near the north and south walls. This large amount of air has to be heated in winter, requiring a fuel cost, and obviously is not causing the air change at the desired place.

In summer the windows would be open, if for no other reason than psychological, and under

this condition the air would probably just circle in the windows and out again, with little or no effect on the west side of the room. Far too many propeller fans are installed in transoms over doors to be a credit to either the sheet metal men or the fan manufacturers.

Many up-to-date ventilating men will immediately say that the only way to handle this problem would be to install hoods of some sort near the source of the fume generation as in Figs. 2 and 3. This is in accordance with the writer's view, which has been borne out many times. Pick up the offender at its origin, whether it be heat, fume, dust or whatnots, and except in very few cases it will be found that this is the most efficient method of ventilating. Only in a few instances, such as in case of too sudden temperature changes or too high local veloci-

(Continued on page 74)



# The New Furnace Dealers' Licensing Ordinance of Dayton, Ohio

To Supplement the Code of General Ordinances of the City of Dayton by the enactment of several sections creating a Board of Examiners of Warm Air Heating Contractors, and providing for the licensing of such Contractors and suspending and revoking such licenses.

Be It Ordained by the Commission of the City of Dayton:

Section 1. That the Code of General Ordinances of the City of Dayton be and the same hereby is supplemented by the enactment of Sections 713-12 to 713-22, both inclusive, to read as follows:

Sec. 713-12. There is hereby created a Board of Examiners of Warm Air Heating Contractors, consisting of the Director of Service and Buildings, a building inspector, the district fire chief in charge of fire prevention, and two warm air heating contractors, all of whom except the Director of Service and Buildings shall be appointed annually by the City Manager for the term of one (1) year, taking office on said Board July 1, of each year, except that the first Board shall be appointed and take office at the time of the taking effect of this ordinance. Before assuming office, each member of the Board shall take an oath before the Clerk of the Commission to properly perform the duties of his office as a member of said Board. The Director of Service and Buildings shall be President of the Board, and the Board shall annually select a secretary either from its own membership, in which case the secretary shall exercise full power of membership, or from without its membership. The secretary shall perform the usual duties of his office, acting as a general secretary and recording secretary, keeping all records of the Board as hereinafter provided. He shall receive a salary of five dollars (\$5.00) for each meeting of the Board which he attends, provided his total annual salary for such services shall not exceed two hundred dollars (\$200.00).

Sec. 713-13. The Board of Examiners shall make such rules and prescribe such procedure as may be necessary for its operation in conformity with this ordinance. Its decisions shall be concurred in by at least three members of the Board. It shall have complete control over the examination of applicants for license under this ordinance, and shall decide upon the qualifications of all applicants. Examinations of applicants shall be conducted at least once each calendar month, if there are applicants who desire to be examined, at such times and places as the Board may designate, and such examinations may be oral or written, or both, at the discretion of the Board. The Board may make such rules and regulations governing examinations as it may see fit, provided that all rules and regulations shall be uniformly applied. It shall keep an accurate record of all applications for examinations, examinations given, and the results thereof. The Board shall certify to the Department of Service and Buildings the names of all successful applicants with recommendations for the issuance of licenses. It shall keep accurate minutes of all its meetings and keep such other records as may be required hereinafter. It shall make a complete annual, written report to the City Manager on or about January 1 of each year.

Sec. 713-14. All persons, firms, corporations, or business organizations engaged in the business or occupation of installing, altering, repairing, cleaning, or adding to any warm air heating sys-

tem in the City of Dayton, regardless of residence, shall be required to secure a license before engaging in such work, and no permit for such work shall be issued by the Department of Service and Buildings to any person, firm, corporation, or business organization unless the provisions of this ordinance have been fully complied with by such applicant.

The fee for such license shall be seventy-five dollars (\$75.00) annually, said license to be effective from July 1 to June 30 of the succeeding year.

An applicant may, if he so desires, procure a license for thirty-seven dollars and fifty cents (\$37.50), which license entitles him to operate for the first six months of any calendar year, i. e., from January 1 to June 30. No license shall be issued after July 1 of any year for less than the prescribed annual license fee of seventy-five dollars (\$75.00).

A license issued to a firm or corporation shall license such firm or corporation to engage in said business or occupation for such portion of the term of said license as the particular member or members, officer or officers, agent or employee who has passed the examination pursuant to which said license is granted, maintains his connection with the firm or corporation and agrees to stand back of and be responsible for all of the work performed by the firm or corporation; provided, however, that on the termination of his connection with the firm or corporation said license may be restored to effectiveness by the qualification of any of its other members or officers who may have successfully passed the examination, or by the employment by the firm or corporation of another agent or employee who has qualified by passing the examination and who will agree to stand back of and be responsible for all work performed by said firm or corporation.

Any person, persons, firm, or corporation who or which operates more than one establishment, branch or outlet for the purpose of doing business as a warm air heating contractor within the limits of the City of Dayton shall be required to obtain a separate license for each such establishment, branch or outlet.

No part of any fee shall be refunded for any cause. No license shall be transferable.

Sec. 713-15. Any person, persons, firm or corporation engaged in the business or occupation of installing, altering, repairing, cleaning, or adding to any warm air heating system who or which shall fail to procure a renewal of license as herein provided within thirty (30) days from the date of its expiration, or such further time as the Board shall fix, shall, before he is issued such license, be required to undergo examination with payment of the fee therefor as in the original instance.

Sec. 713-16. For the purpose of this ordinance the following definitions are adopted:

"Warm air heating contractor" shall be deemed to be any person, persons, firm, or corporation who or which installs one or more furnaces in any one year or who or which proceeds under direct contract with an owner or owner's representative with the installation, repair, alteration, cleaning, or addition to any warm air heating system, except stoves, for the purpose of furnishing heat within the corporate limits of the City of Dayton, Ohio, excepting property owners who install, repair, alter, clean or add to the warm air heating systems located in their

own residences; provided, however, that an owner who installs, alters, repairs or adds to the warm air heating system in his own residence shall take out all permits for such work as are required by the Building Code and general ordinances of the City of Dayton.

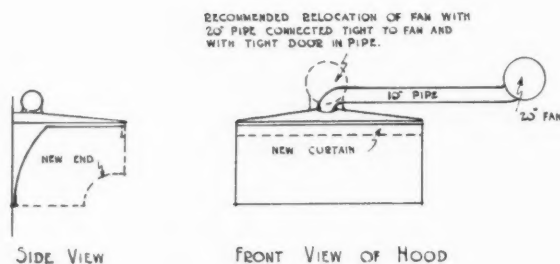
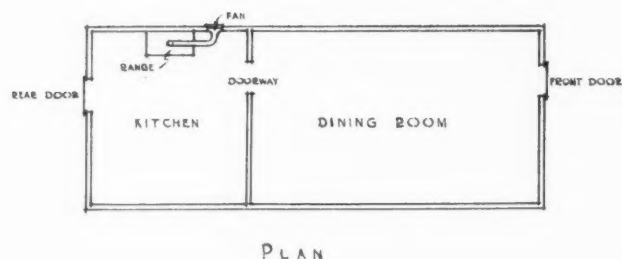
A "firm" or "corporation" is defined to be a business organization engaged in the work of installing, repairing, altering, cleaning, or adding to warm air heating systems, the members and officers of which may or may not have obtained individual licenses pursuant to this ordinance. No license shall be issued to any such person, firm, or corporation, however, until at least one of its members, officers, agents, or employees shall have passed the examination hereinabove referred to and agrees to stand back of and be responsible for all of the work performed by such firm or corporation.

Sec. 713-17. Before any person shall be issued a license under the provisions of this ordinance, he shall be required to pass an examination administered by the Board of Examiners hereinbefore created and receive from said Board a certificate to the effect that he has duly qualified as a warm air heating contractor.

The examination fee shall be five dollars (\$5.00), and no part of said fee shall be refunded on account of the failure of the applicant to qualify for a license.

Sec. 713-18. The Board of Examiners shall have the power to revoke all licenses issued under this ordinance. A license shall be revoked immediately by the Board upon conviction of the holder thereof, duly had in a court of competent jurisdiction, of the violation of the laws of the State of Ohio or of the ordinances of the City of Dayton, relative to the installation, repair, cleaning, alteration, or addition to warm air heating systems. A license issued pursuant hereto may also be revoked by the Board in its discretion when it finds that the licensee is guilty of fraudulent use of his license or of incompetency in the exercise of the privileges of said license of fraud or misrepresentations in securing the license or permits granted pursuant to the Building Code of said City, of refusal to conform his work to the requirements of law or of such other breaches of duty by licensee hereunder as the Board may regard contrary to the intent and purpose of this ordinance. In all cases involving revocation of license at least fifteen (15) days' notice of the contemplated revocation shall be served upon the licensee whose license is in question, and said notice shall be in the form of a summons as provided by the laws of Ohio in civil actions and shall be served in the manner provided by said laws for the service of said summons. It shall indicate the time and place of the hearing, the general grounds of said contemplated revocation, and shall advise the licensee of his right to appear at said hearing in person and by counsel for the purpose of presenting his defense therein. Such licensee shall have the right to interrogate witnesses at said hearing and be heard orally upon the merits of his defense. The Board shall have the power to subpoena and compel attendance of the same, to administer oaths, to punish for contempt, compel the production of records and other documentary evidence, and do all lawful things essential to a full hearing of the case before it. It shall make a complete record of such cases, and may at its

(Continued on page 72)



## Some Suggested Remedies For A Troublesome 'Range Hood

By Paul R. Jordan  
Indianapolis

**T**HIS article discusses a ventilation problem for a restaurant in which there are several troubles to be cured. This is not an uncommon condition in small restaurants where equipment is installed without regard to ventilating requirements. This particular equipment was bought second hand, and naturally is installed in a rather haphazard fashion.

The only outside openings to either the dining room or the kitchen are the front and rear doors. The dining room is perhaps 60 feet long by 20 feet wide; the kitchen, 30 feet long by 20 feet wide. The two rooms are separated by a partition, connected by an open doorway, with no door. The range stands against the west wall, about midway between the partition and the rear door. Over the range is a hood, and connected to it a pipe running to within about 18 inches of a bucket type exhaust fan, installed in the west wall. The fan apparently has been installed in the window previously, and has been connected up with the pipe to the hood as a matter of convenience, rather than to move it to a window directly above the center of the hood, which would have eliminated one turn.

The difficulty was primarily with cross-currents blowing the smoke out from under the hood when the rear door was open, and

sending it into the dining room. As they cook many steaks, the condition has been very bad at times.

The owners were getting practically no help from the fan, due to the fact that a screen over the window, outside of the fan louvers, was stopped up practically solid. The fan, furthermore, was not an efficient type.

### Hood Area

The pipe from the hood was not connected to the fan, but stopped 18 inches from it. Furthermore, the pipe which was 10 inch, was too small for the hood.

The hood was open at the front and at both ends with the back closed. Hood ratio must take into consideration the opening into the hood, rather than the size of the top of the hood. This hood measures approximately 4 feet by 8 feet. However, the top of the hood is approximately 5 feet above the top of the range. With both ends and front open, there was a hood opening at each end, 4 feet by 5 feet, or a total of 40 square feet for the two ends; and in addition to this, there was a front opening 8 feet by 5 feet, or another 40 square feet. We therefore have a total of 80 square feet of hood opening to be handled by a 10-inch pipe; in other words, approximately 150 to 1 ratio. This ratio is of course entirely too great.

The easiest and least costly solution is to remove the screen from in front of the fan. Having done this, we are able to get a flue velocity through the pipe with the fan running, of 110 feet per minute. That velocity of course, is quite low, but is just that much better than before the screen was removed.

The next logical step is cutting down the hood ratio. This can be accomplished by stopping up the ends to as great a degree as possible, and by dropping down a curtain from the top to a point as low as possible. By this means the hood ratio can be cut down by about one-half, or in other words, to around 75 to 1. This still is too great, although a decided improvement.

### Cross Currents

Inasmuch as the fan is a 20-inch-size, this pipe can be increased to 20-inch diameter, giving us four times as much pipe area, and cutting down the hood ratio four times over, leaving it approximately 20 to 1. This is getting the hood ratio down to about where it ought to be.

Ends put in the hood will tend to keep cross currents, set up by opening of the back door, from sweeping the smoke out from under the hood; but in addition to that, it will be advisable to keep the back door closed as

(Continued on page 70)





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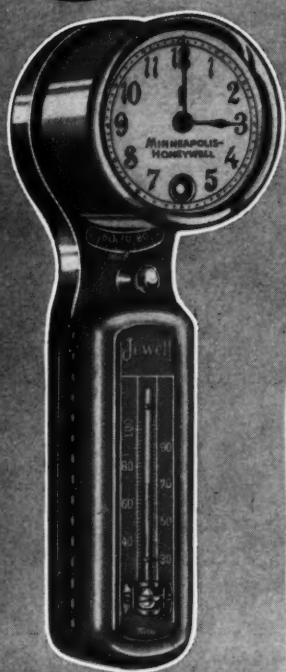
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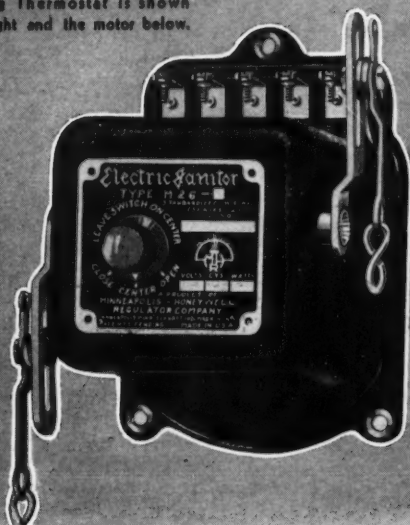
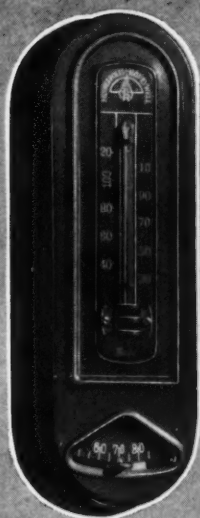
A-9

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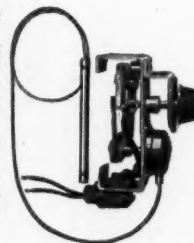
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## AIR-PAK

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# Insulation For House Construction \*

By J. D. Hoffman  
Professor of Practical Mechanics  
Purdue University

[Part 5]

In the August issue Professor Hoffman discussed the basic formulas from which heat loss calculations are made. This article takes up the all-important subject of heat losses through uninsulated attic floors. Since this source of heat escape is probably the largest single source of loss, readers are urged to study this article carefully.

**T**HE attic-ceiling combination is one of the principal sources of heat loss. Most residences except those where some specific use is to be made of the attic space, have no tight floor in the attic and no insulation between the joists. This results in unusual heat losses through the lath-and-plaster ceiling from the room below to the attic space where it is lost from the building through the roof and through the finish at the eaves. (See Fig. 14.)

Occasionally only a portion of the attic is floored, as where a play room or sleeping room is built-in. This partial flooring (Fig. 15) is almost as bad as no floor, since the heat trapped between the ceiling of the rooms below and the floor of the attic room is carried by air currents between the joists to the sections not floored where it escapes to the attic spaces,

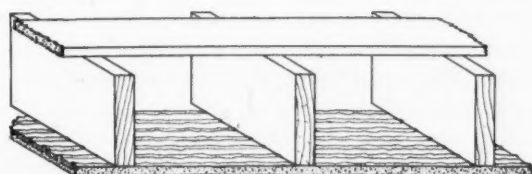


Fig. 14

Most attics have loose boards and no insulation making the heat loss through the underlying ceiling very high.

A. Flooring in the attic is not very effective unless it is tight and unless it entirely encloses the spaces between the joists. Where a partial floor is put in, the spaces between the joists should be filled in at x (See also Fig. 10). Even in such cases the heat loss through the section not floored should be reduced to a minimum.

## One-Story House

We have so far been talking of general points that affect all houses having framed walls. Now let us look at a more specific case, the one-story house. These houses are too frequently hard to heat and an analysis of the causes almost always shows the attic spaces having little or no insulation on the attic side. (See Fig. 16, A, B, and C.)

It is a very common practice, when planning one-story houses, to have one or more rooms on the second floor. These rooms may or may not be in immediate use and may not be furnished, but this does

not remove the trouble, because heat losses continue. Not only are the floors omitted from the attic spaces but the side walls of the second floor rooms, exposed

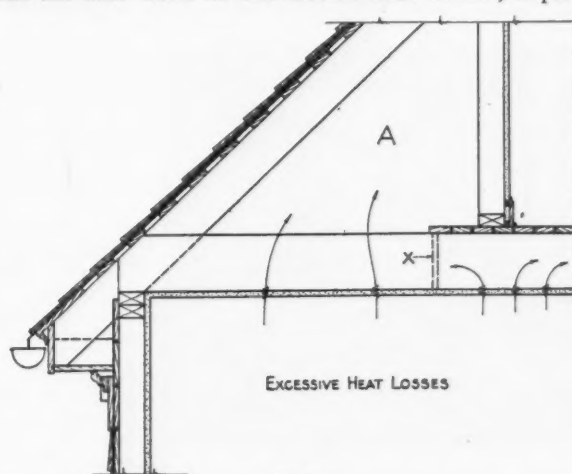


Fig. 15

Partial attic flooring, or flooring over only a part of the floor is of practically no benefit because rapid heat leakage occurs through the unfloored areas.

to the attic, are seldom sheathed. This makes a condition more exaggerated still than the attic floor problem previously illustrated.

One case like this, a little more striking than usual but illustrating the point, was of a one-story house having better than average material and workmanship

(Continued on page 46)

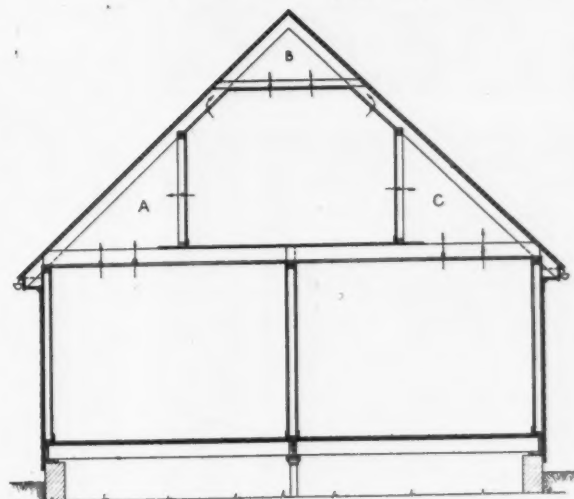


Fig. 16

One-story houses are frequently hard to heat because of the unheated and uninsulated attic as shown here. Heat loss into the attic is tremendously high.

\*Reprint of Extension Series No. 31, Engineering Extension Department, Purdue University.





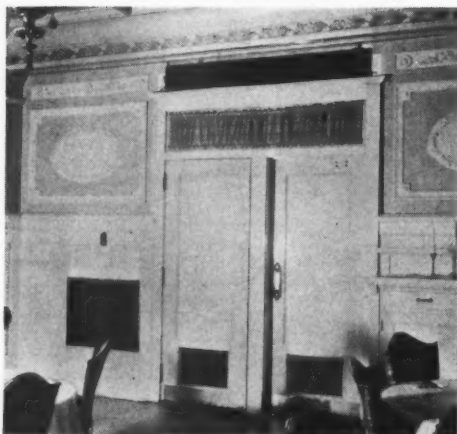
## Maytag Hotel— A Completely Air Conditioned Building



At top—Exterior of the Maytag Hotel showing size of building and general construction.

A guest room showing incoming air register at ceiling; radiator for heating under window.

Corner of the coffee shop showing incoming air grille above the door and exhaust grille just above the baseboard.



Lower left—F. L. Maytag among compressors in pent house.

At bottom—View of cooling coils and part of filter frame. Filters in foreground removed to show coils.

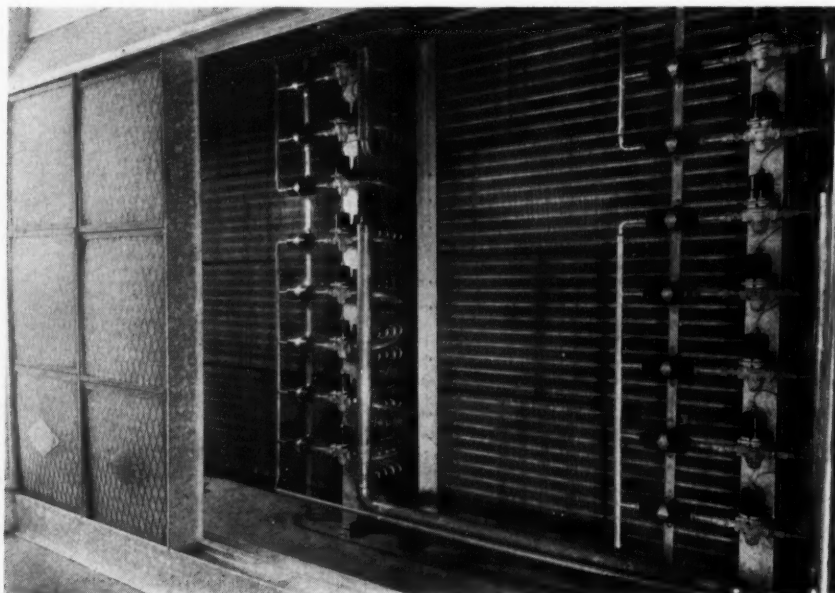


**I**N June of this year F. L. Maytag, founder and president of the Maytag Company, world's largest manufacturers of washing machines, placed the order with Frigidaire Division, General Motors Corporation, for the complete air conditioning of the hotel in Newton, Iowa, that bears his name.

Faced with the usual summer slump that befalls hotels in hot and sultry weather, Mr. Maytag considered air conditioning as a means of keeping the hotel and its services as well patronized in summer as in winter.

An interesting result, shown by the summer's registration was that commercial travelers who normally would work out of some other city, changed their routes so they could at least stay overnight in Newton if not work out of the city in all directions for several days or a week. Also, according to Mr. Maytag, regular winter patrons of the hotel asked for reserved quarters to be sure of having air conditioned sleep during hot weather. And as for hay fever sufferers—well that's a long story, too. Registrations showed that the Hotel Maytag became a summer resort for victims of this allergic ailment.

The air conditioning system installed in Hotel Maytag consists of several plants. One hundred



First floor plan showing ducts through kitchen to tap room and dining room, also outside air intake, old and new duct work.. The lobby is not cooled in order to discourage loafers.



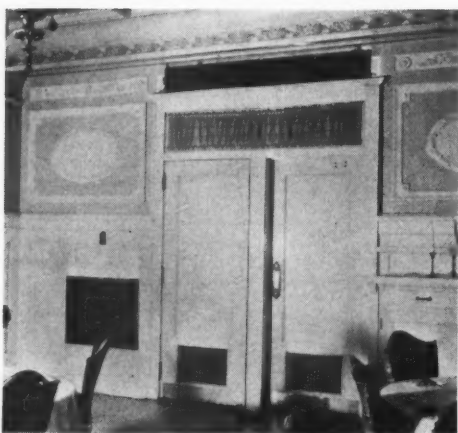
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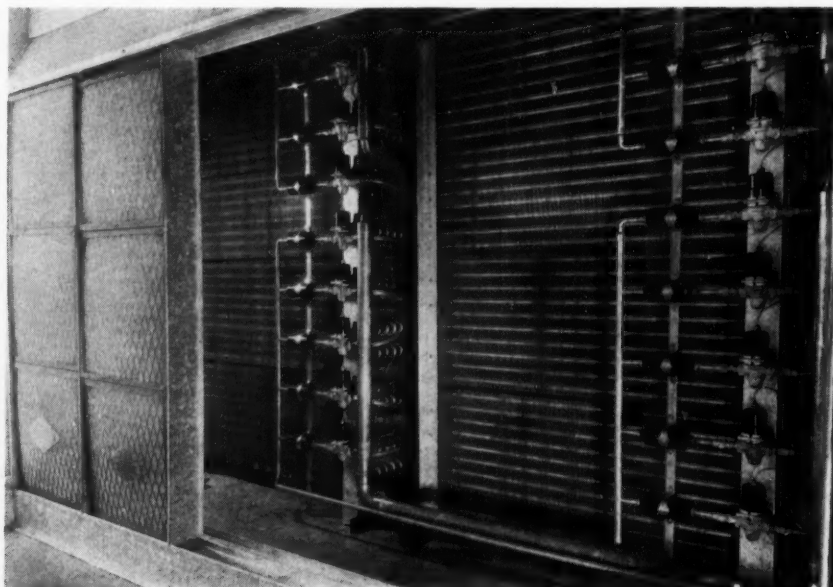


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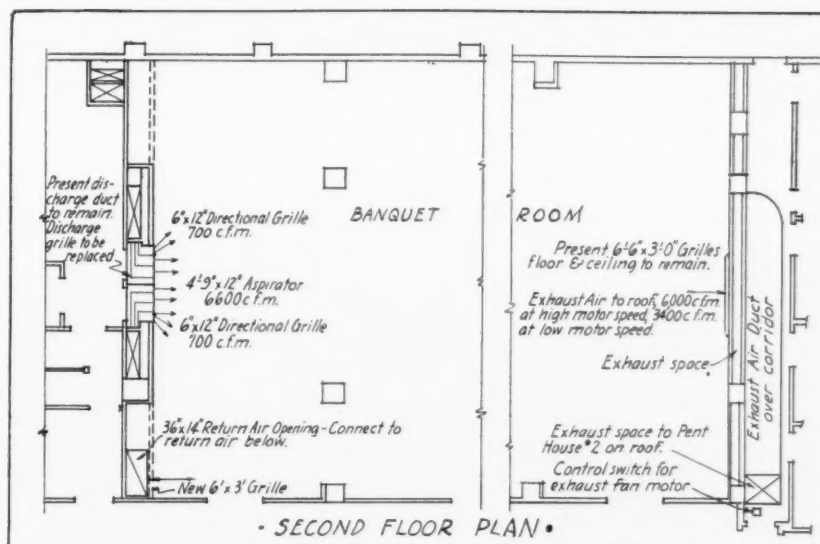
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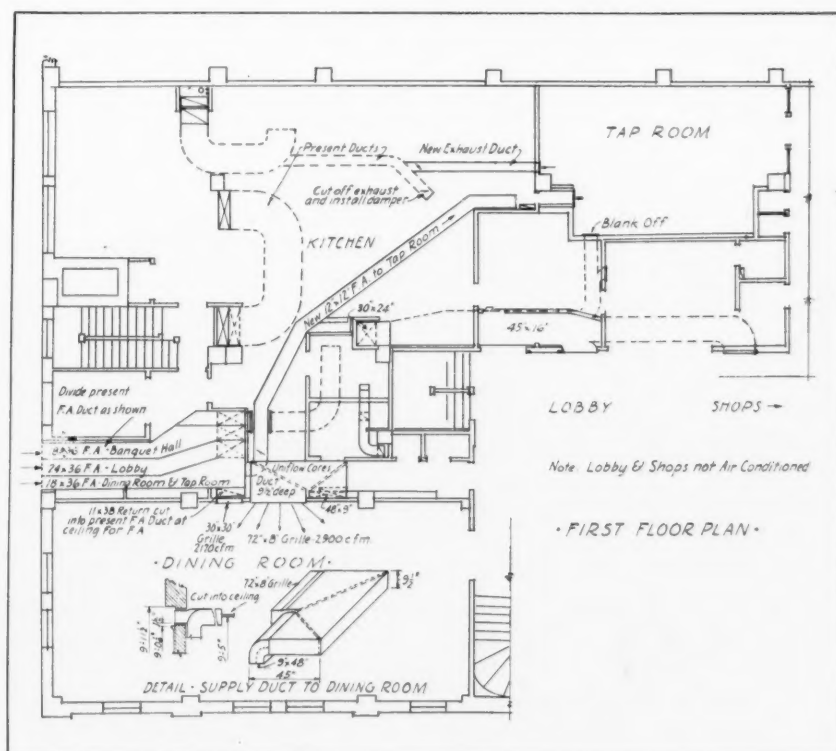


Hotel Maytag was built in 1926, by Mr. Maytag to provide adequate facilities for the many members of his own manufacturing organization who visited Newton frequently on business and also for

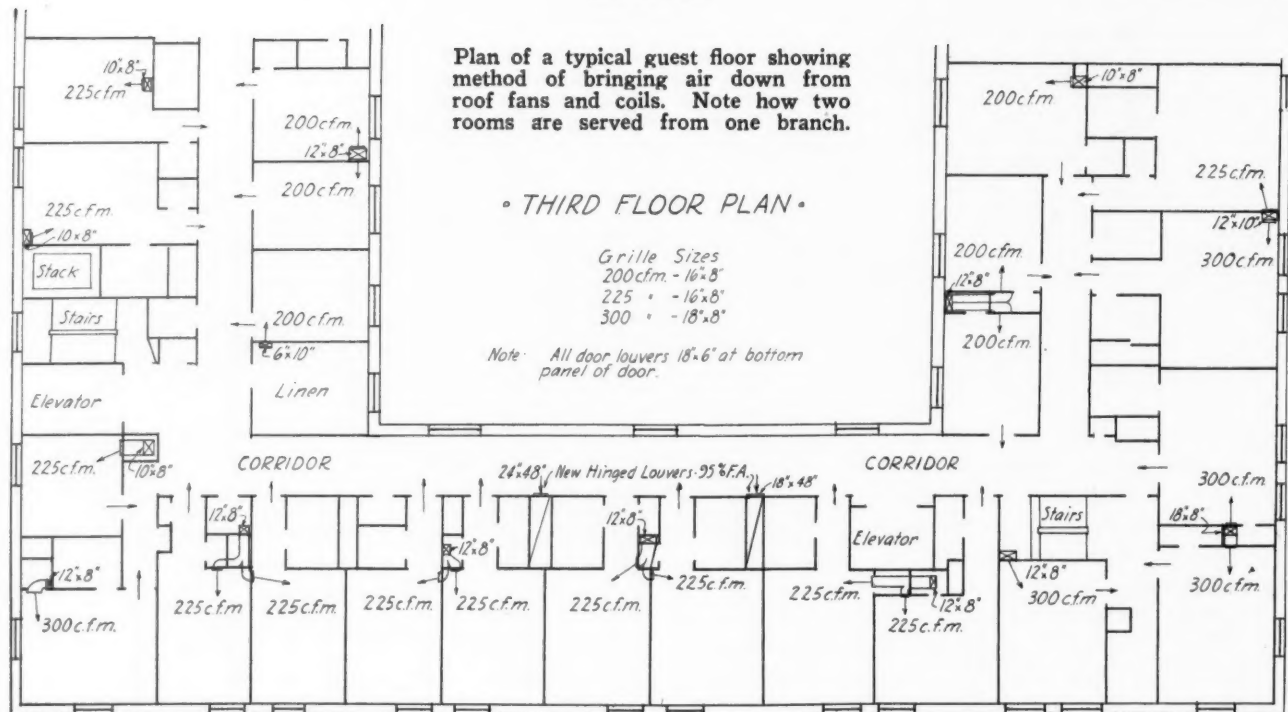


To install a duct system in a building as large as a hotel and nine years old was an engineering job by no means easy. Places for the ducts, the

"The air conditioning engineers, the installation men and the electricians and carpenters arranged their work so well," he said, "that



First floor plan showing ducts through kitchen to tap room and dining room, also outside air intake, old and new duct work. The lobby is not cooled in order to discourage loafers.



we lost the sale of only one \$1.75 room for one night. This occurred when we were well filled up and just couldn't find a room for a guest."

The cooling system has a capacity of 100 tons, the ball room alone requiring thirty tons of refrigeration. Two compressor installations were made in the basement to handle the public rooms. Five other compressors were placed on the roof of the hotel in newly constructed penthouses that shelter compressors, filters and blowers.

In addition, a spray tower thirty feet square and twelve feet high with a capacity of 450 gallons of water a minute was built to cut down consumption of city water necessary for the operation of the refrigerating compressors.

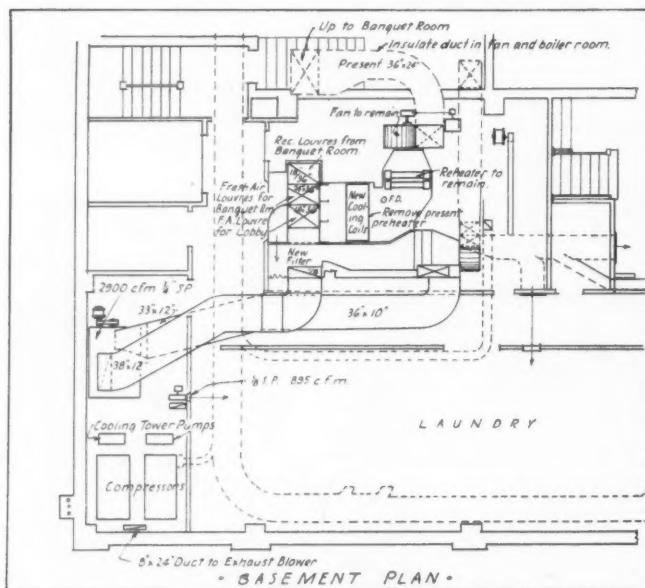
Ducts from the roof units were run down through the closets of the suites and rooms and grille open-

ings cut into the walls near the closets. Grilles to permit free flow of air out of the rooms were cut a few inches above the floor in the doors opening into the corridors. At intervals in the corridors, return grille openings were installed to permit the warm air to push its way back to the recirculation chambers above. The filters on the roof cleanse the air of dust, dirt and pollen and intakes for the addition of fresh air are so arranged that odors and smoke are automatically expelled.

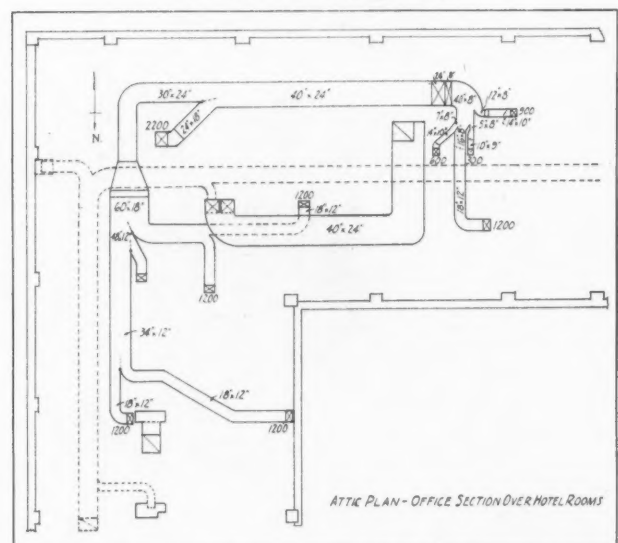
The motors which power the compressor units are installed in such a way that eighteen automatic starters control them. These are interlocked so the units start up consecutively to prevent an unusual load on the power lines.

A half dozen push buttons with colored indicator lights in back of the desk of the manager on the

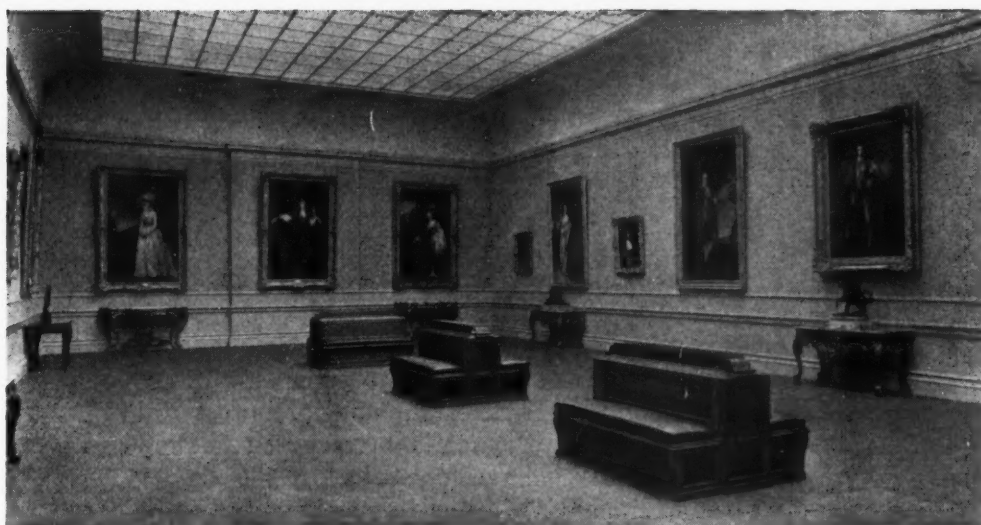
(Continued on page 50)



Plan of duct work and apparatus in basement. These fans and coils serve the public rooms on first floor.



Plan of duct work through attic. These ducts run from apparatus in pent house to branches going down to guest rooms.



## Air Conditioning Protects Art Treasures Worth Millions of Dollars

By J. Edward Tufft

**W**HEN portraits cost from five hundred thousand to one million dollars each and are classed among the world's finest art treasures, no investment in air conditioning can be considered too great if it gives assurance of preserving the pictures indefinitely.

That is why the board of directors of the Henry E. Huntington Library and Art Gallery at Pasadena, California, was willing to invest thousands of dollars in the air conditioning system in the new wing recently added to the library building. "The Blue Boy," "Pinkie," "Mrs. Siddons as 'The Tragic Muse,'" and seventeen other portraits almost as famous as these are at stake.

The work was engineered by Elliott L. Ellingswood, Los Angeles, and installations were made by the E. O. Nay Company of Pasadena. Several problems were involved in the engineering job. It was desired to maintain a dry bulb temperature of 75 degrees Fahrenheit and a relative humidity of 58 degrees throughout the room, even to the ceiling. Since practically the entire ceiling is a glass skylight with an attic above, also with a glass roof, a way had to be found to prevent heat from entering from the heated attic and by solar radiation.

Since the building is an earthquake-proof structure and consists of two concrete shells one inside the other with a 4-inch space between the walls and a much larger space above the ceiling, the problem was met by creating a forced circulation of air in this air space. A portion of air is drawn in at the ground level on the shaded side of the building and expelled on the same side of the building from the attic after it has made the circuit

of the inner shell. The room is therefore surrounded by a cool jacket of air. All air is passed through sprays of water, the water used not being wasted, but returned to serve again in connection with the refrigerating unit.

Even temperature from floor to ceiling is accomplished by propelling the tempered and humidified air into the room at high velocity through centrally located registers. Exhaust grills are near the air entrances. Traveling in a wheel-like path the upper portions of the room get high air turbulence just as does the lower portions. The velocity of the air as it enters is the main secret of the good results. A seven-minute change of air in the room is maintained.

Thermostatically controlled twin louvers proportion the percentages of outside air and re-circulated air admitted to the room. During the few months that heat needs to be added rather than subtracted the air passes over steam coils, the steam being supplied from the boiler room in another building through underground conduits.

The type of registers are novel. There are four of these placed and built to appear as part of the double settees (see picture). The incoming air is blown through registers at the top of the davenport backs and the outgoing air finds exit through registers near the floor at the ends of the davenports. The walls are thus untouched and their strength unimpaired; the floor alone being pierced.

The gallery measuring approximately 70 feet long, 30 feet wide and 20 feet high has no windows and the only door is the entrance. The electrical refrigeration unit uses a 50 hp. motor.



# Forced Air Heating Facts From the Research Residence

By S. Konzo  
Special Research Associate,  
University of Illinois

In this article, the tenth of the series, the author continues his explanatory articles on pressure measurements of air flow, with particular emphasis on static and total pressures. Test results about pressure losses in a forced-air heating system are comparatively meaningless unless the reader is at least partially familiar with the terminology, the units, and the limitations of air flow measurements in general.

## What Is Total Pressure?

### Velocity Pressure

IN the previous two articles we considered the nature of "velocity pressure" and "static pressure" as applied to air flow measurements. The following illustration was used in explaining the nature of velocity pressure.

"Now suppose that we imagine a case in which water is flowing in an open trough. That water has velocity; it moves; it can carry along with it other particles suspended in the water. If we should suddenly cap our hand over the end of the trough and stop the flow of water, we would feel exerted against our hand a force, which is designated as velocity pressure or velocity head.

"Velocity Head or Velocity Pressure (abbreviated to V. P.) is defined as that pressure which is required to create the velocity of flow. Velocity pressure is dynamic, in the sense that it involves a movement of the particles composing the fluid."

### Static Pressure

The following explanation was used in defining static pressure:

"The nature of static pressure is quite different from velocity pressure. In fact the term static pressure implies a pressure which is at rest, whereas velocity pressure is a pressure which accompanies the movement of the fluid.

"In simplest terms, static pressure (abbreviated to S. P.) is that pressure which tends to burst open the pipe or enclosure containing the fluid."

Furthermore, the statement was made that "it is not always true that static pressure measurements will give the frictional resistance to the flow of air. Static pressure measurements between two sections in a duct will give a true index of the frictional resistance to the air flow only when the size of the ducts at the two sections is the same.

### Total Pressure

When the size of the duct at two different sections is not the same, then the difference in static

pressure measurements at the two sections will not give the frictional resistance between the two sections.

In fact, the indiscriminate usage of static pressure measurements in ventilation work may lead not only to incorrect conclusions, but also to absurd results. The manufacturer and installer should know the limitations of static pressure measurements if he desires to use them in the field.

On account of this limitation with the use of static pressure measurements, it is recommended that for general practice, only "total pressure" measurements should be made. *The Total Pressure is the sum of the velocity pressure and static pressure at any given section.* This relationship may be expressed by the following equation:

$$T.P. = V.P. + S.P.$$

where the T.P., V.P., and S.P. are abbreviations for total pressure, velocity pressure, and static pressure respectively.

### Measurement of Total Pressure

The measurement of total pressure can be made quite easily by means of a Pitot tube, such as that shown in Fig. 1. It should be noted that only one rubber-hose connection is necessary from the Pitot

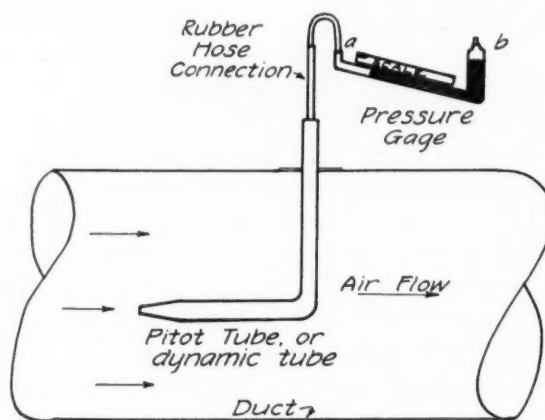


Fig. 1—Line diagram showing method of making total pressure determinations.

tube to the pressure gage. The pressure gage may be of the U-tube type for pressures above 3 inches water gage, or of the inclined manometer type for pressures less than 3 inches. The latter type is shown in the diagram in Fig. 2. Other instruments for the measurement of air pressures are also available on the market. In fact any draft gage that is adapted to the purpose of making draft measurements can be used for air pressure measurements as well.

It will be found in general that the total pressure at a given duct section will not be the same in the

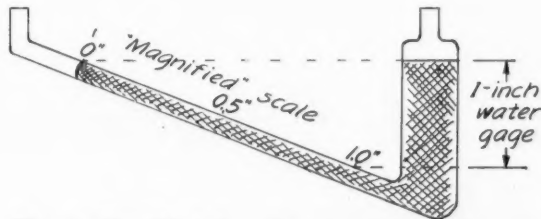


Fig. 2—Simplified line diagram of inclined manometer or pressure gage.

center of the duct as it is near the edge of the duct. It is advisable when making measurements of the total pressure to take the average of several readings made at different points in the given duct section.

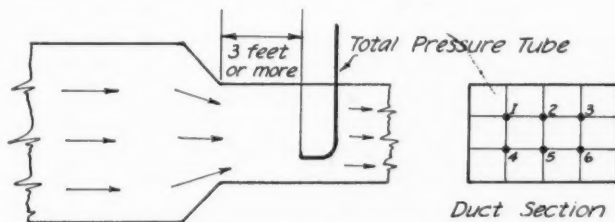


Fig. 3—Total pressure measurements should not be made at abrupt changes in a duct section. The average of several readings should be obtained

It will also be found necessary to make measurements at least three feet away, and preferably further, from any changes in the duct section. The turbulent conditions in the air stream that are caused by bends, expansions and contractions of

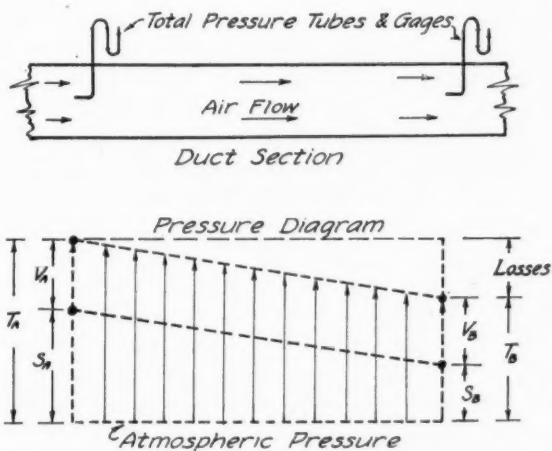


Fig. 4—Variation in velocity pressure, static pressure and total pressure in a duct of constant cross section. "V" refers to velocity pressure; "S" refers to static pressure and "T" refers to total pressure.

the duct section are not favorable to measurements of air pressure. See Fig. 3.

#### Duct of Uniform Cross-Section

Suppose now that we start with a simple example of pressure measurement. The object in this case is to determine the pressure loss between stations A and B of a duct of uniform cross-section, such as is shown in Fig. 4.

It may be noted from the pressure diagram in the lower part of Fig. 4 that the following relationships are shown:

$$1. V_A + S_A = T_A,$$

or the sum of the velocity pressure and the static pressure at any section is equal to the total pressure.

2. Also,

$$V_B + S_B = T_B$$

for the same reason.

$$3. T_A - T_B = \text{Losses},$$

or the losses are equal to the difference in total pressure.

4. Furthermore, since the duct is of the same cross-section at stations A and B the velocity is the same at both points. Therefore

$$V_A = V_B$$

5. As stated before, in this particular example of a duct of uniform cross-section, the losses are also equal to:

$$S_A - S_B = \text{Losses}$$

This does not apply to the following example.

#### Duct of Varying Cross-Section

When the duct is *not* of uniform cross-section the conditions are slightly modified from the simple example shown above. See Fig. 5.

The following relationships are shown in the lower part of Fig. 5.

$$1. V_A + S_A = T_A \text{ and}$$

$$V_B + S_B = T_B$$

As in the previous example in Fig. 4, the sum of the velocity pressure and the static pressure at any point is equal to the total pressure.

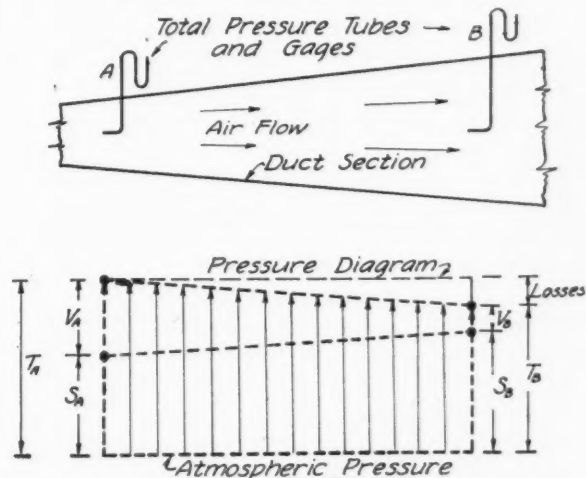


Fig. 5—Variations in velocity pressure, static pressure and total pressure in a duct of varying cross sectional area. Compare with Fig. 4.

2.  $T_A - T_B = \text{Losses}$ , or the losses are equal to the difference in total pressure.

(Continued on page 43)



Exterior of three-house bed for which details are given on the facing page. The heating plant is in a separate building.



Interior of greenhouse showing flowers. Air is supplied under benches and exhausts at roof ridge.

## Orchid Growers Adopt Air Conditioning To Insure Prize Flowers

By F. E. Hawkins  
Los Angeles, Cal.

**A**T a recent orchid show in a nearby city, thirteen amateurs exhibited the result of their work in the growing of orchids in greenhouses. Being an orchid show 90 per cent of the display was orchids, the other 10 per cent was other rare flowers and plants from other countries.

I had the pleasure of installing air conditioning equipment and duct systems for two of the exhibitors. One had three greenhouses heated and cooled along with the other necessary parts which make up an air conditioning system, and the other had two greenhouses air conditioned.

### Description of System

I will describe the system for the greenhouses of exhibitor I, who had three. Some distance away from the greenhouses, in a separate building is located the furnace room, which is used to generate the necessary steam for heating. From the furnace room the steam is piped to the preheaters and heaters and finally to the balancing heaters which are near the air outlets in the greenhouses. All three series of heaters are located in the duct systems. The inlets of the systems are located in the floors, and are supplied by soil pipe lines which are 16 inch round pipe and discharge into 16 inch diameter round galvanized iron hoods the tops of which are nearly flat. The air enters at very low velocities. Other ducts under the floor are of concrete and are insulated. All other ducts are of galvanized iron. The systems are all automatically controlled and have all the necessary gauges for humidity, wet and dry bulb thermometers, time controls and so on.

Cooling is accomplished by evaporation, using well water. This group of greenhouses is located in a cool mountain setting and the well water is

exceedingly cold which makes refrigeration unnecessary.

In cold weather when the system starts the automatic dampers open for the greenhouse which is calling for heat and the plant is started in operation. It then conveys a small amount of outside air and a considerable amount of recirculated air through the fan, pre-heater, heater and on to the tempering heater, also receiving the necessary amount of moisture for the high humidity.

The heat coming in at the floor forces the cold air out at the ridge through galvanized iron ducts back to the fan where it can be recirculated and reheated.

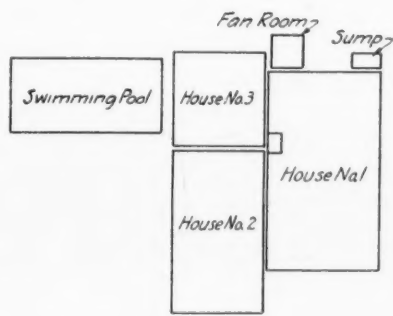
### Hot Weather Cooling

For cooling it is necessary to pump the well water through the air washer which cools the air going into the greenhouse. However, the automatic valve is changed for cooling and instead of recirculating the warm air when it comes out of the greenhouse, as with heating, the warm air is discharged to the outside and new outside air is taken in at the louvre and cooled to a lower degree by the well water, fan and air washer.

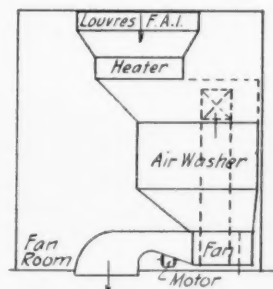
The system is so arranged that by the use of slide dampers the air circulation can be revised—the air entering at the discharge duct outlets and exhausting at the floor inlets.

Another feature of the cooling system is that along the ridges of each greenhouse there is a cold water pipe line direct from the well with small holes two inches apart to spray over the glass roof to help in cooling. The water is caught in gutters at the rafter ends and conveyed to the swimming pool. Orchids of all varieties from all parts of the world are grown in these greenhouses along with other rare plants.

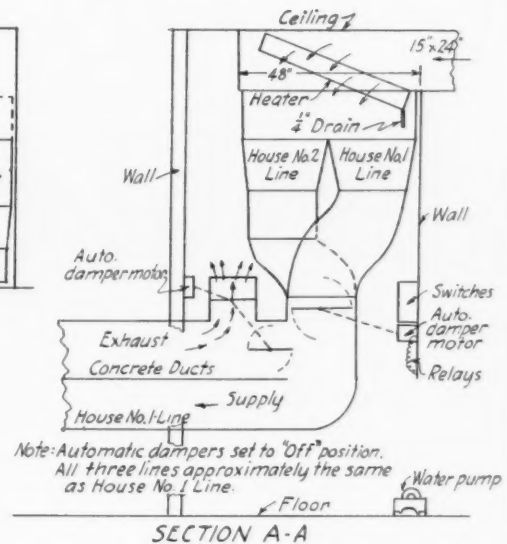




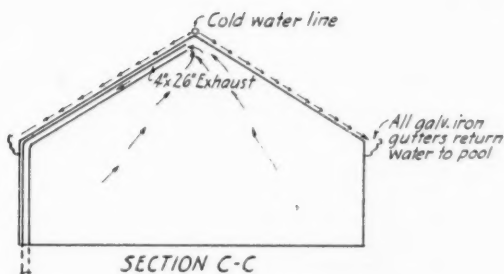
Plot Plan



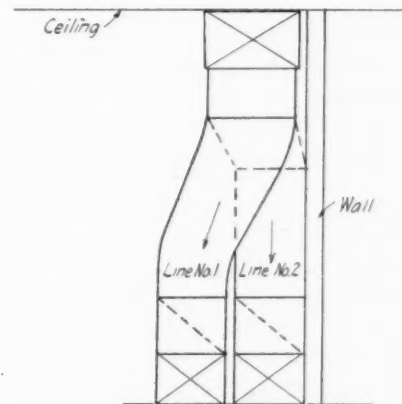
SECTION D-D



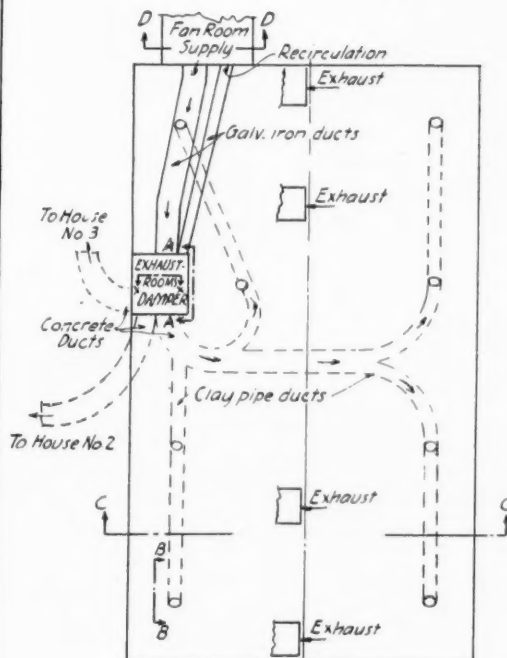
SECTION A-A



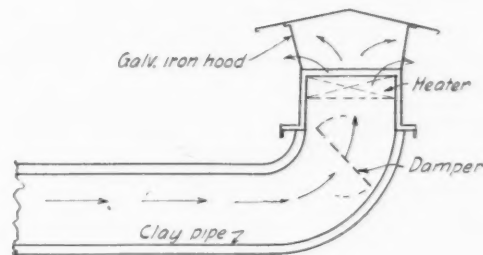
SECTION C-C



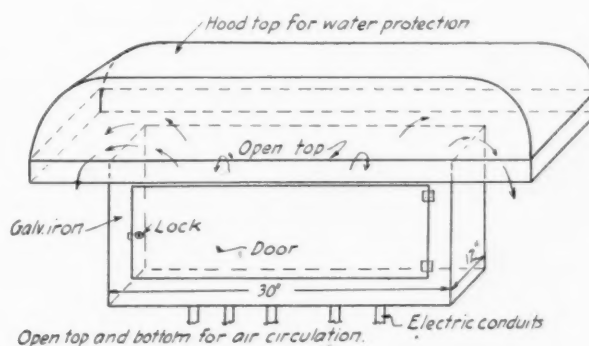
SECTION X-X



PLAN OF HOUSE NO. 1



SECTION B-B



INSTRUMENT BOX-ONE FOR EACH HOUSE  
(Time-O Stats, Thermometers etc.)

# Automatic Control For Cooling Systems

## Compressor Cooling

LAST year The Detroit Edison Company sponsored the installation of cooling equipment in a residence located in a Detroit suburb. The cooling equipment consists essentially of a two-ton refrigerating machine and direct expansion cooling coil, with the ducts of the conventional forced warm air heating system used as the means of distributing the cooled air. The installation was described in a previous article entitled, "Summer Cooling In a Detroit Residence"; but only a brief reference was made to the type of control equipment employed. It is the purpose of this article to more fully describe the control system developed for this installation and to correlate the operating experience gained with this installation with the general subject of automatic controls for air conditioning systems.

The control diagram for the cooling system is shown in the accompanying figure, and the controls function in the following manner:

The operation of the refrigerating machine is controlled by the low voltage thermostat "F" located in the dining-room. When the thermostat calls for cooling, it energizes the solenoid operating the valve on the liquid line to the cooling coil and opens this valve, allowing refrigerant to flow into the coils. When the vapor pressure in the coil has built up to about 40 pounds, the low pressure switch "H" closes and en-

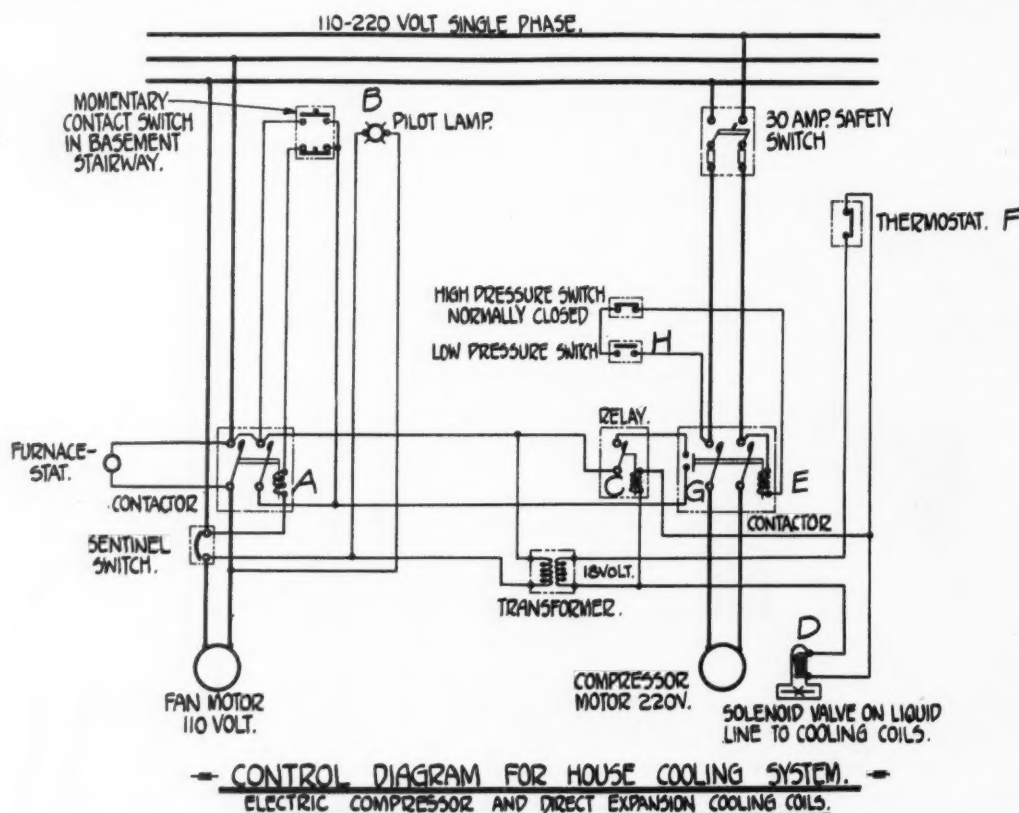
In the articles covering automatic control of cooling systems we have made no mention of control of systems using a compressor because there seems to be no unity of thought. This article explains some experiments with controls in the Detroit Edison Research Residence, Detroit.

By G. B. Helmrich  
The Detroit Edison Co.

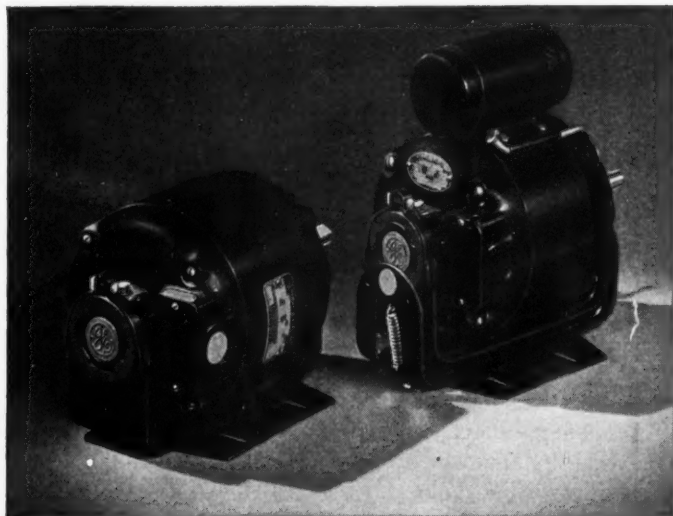
energizes the holding coil "E" in the compressor motor starter and closes the starting contactors in the 220 volt circuit supplying the motor and starts the motor. When the room temperature has been reduced to that of the thermostat setting, the solenoid operator on the liquid valve is de-energized by the opening of the thermostat circuit, and valve "D" is closed. The refrigerating machine continues to operate and "pumps down" until the suction pressure is reduced to about 7 pounds, at which pressure the low pressure control switch opens, de-energizes the holding coil "E," opens the starting switch and stops the motor.

As it was considered desirable to have the circulating fan start automatically with the starting of the compressor so that the occupants of the home would have only one operation to perform when desiring to start the cooling system; namely, to move the room thermostat to a setting below the existing room temperature, the 110 volt fan motor circuit was tied into

(Continued on page 40)



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## Automatic Controls

(Continued from page 38)

two auxiliary contactors which were available in the starting box for the compressor motor. The closing of the starting contactors for the compressor motor also closes contactor "G" in the 110 volt circuit supplying the fan motor. This action energizes the holding coil in magnetic switch "A," closing the fan motor circuit and starting the fan. It is also desirable to have the circulating fan operate for an indefinite period after the refrigerating machine shuts down so that there will be no tendency for the air to stratify in the rooms, and so that full advantage may be taken of the cooling effect produced by drawing the cool air from the lower levels and discharging it at higher elevations; as well as also taking advantage of the cooling effect of air movement. There is an additional advantage in that the residual cooling power in the coils can be utilized by the continued circulation of air after the refrigerating machine has stopped.

### Fan Operation

Although the refrigerating machine was usually shut down at about 8:00 or 9:00 o'clock in the evening, the fan was permitted to operate until the occupants were ready to retire, and then it was stopped by simply pushing the button in the momentary contact switch "B" located in the basement stairway. It should be noted that when switch "A" is once energized by action of switch "E" and closes the fan circuit, it cannot be de-energized by the stopping of the compressor, but can only be opened by pushing the button on momentary contact switch "B"; thus the fan continues to operate after the compressor stops. This manual control switch for the fan was also used to start the fan independently of the compressor if recirculation of air without artificial cooling was desired, or if it was desired to cool by bringing in outdoor air at night.

### Controlling Re-cycling

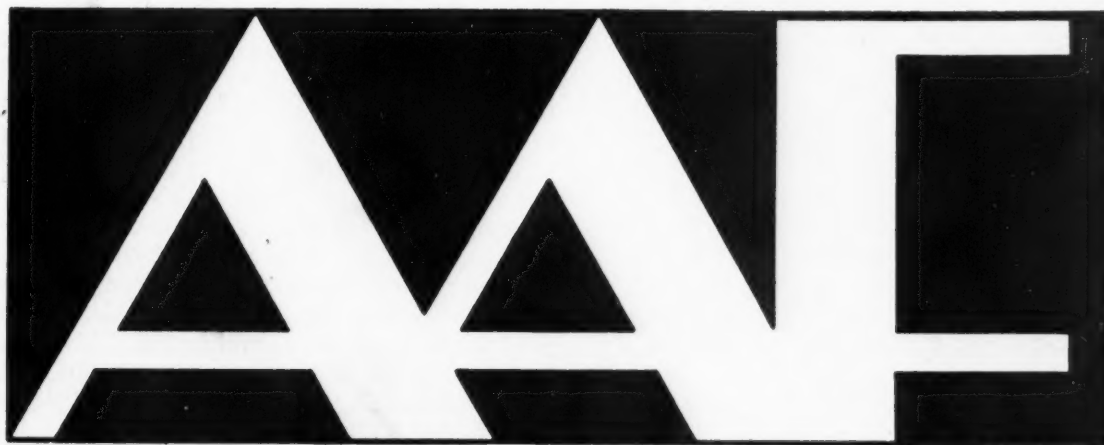
Switch "C," located in the same circuit as magnetic switch "A," was not installed at first, but it was found after a few days of experience that enough refrigerant remained in the cooling coil after the compressor was shut down to permit of a slow building up of pressure to a point where the low pressure switch came into operation and started the compressor. The compressor only turned over a few revolutions, of course, before the pressure in the coil was reduced to a point where the low pressure switch opened, and the compressor stopped. This so-called "re-cycling" of the compressor frequently took place in the early hours of the morning, and as this action automatically started the circulating fan, the house occupants awoke in the morning to find the fan running.

The operation of the fan, under such conditions was, of course, quite unnecessary and undesirable from the householders standpoint, so magnetic switch "C" was installed with its holding coil connected to the 18-volt thermostat-solenoid valve circuit. This holding coil in switch "C" was only energized when the thermostat was calling for cooling, and the solenoid

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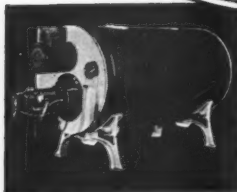
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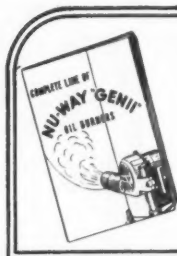
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valve had opened preparatory to starting the compressor. Re-cycling of the compressor independently of the action of the thermostat, or, in other words, with the solenoid valve closed and the thermostat circuit open, will not cause the fan to start because under these conditions switch "C" will be open. The furnace-stat is connected in parallel with the summer cooling controls so that the fan motor may be controlled in the heating season quite independently of the cooling equipment controls.

#### Thermostat Controls Solenoid

The connecting of the room thermostat to the solenoid valve on the liquid line, rather than to a relay in the motor starter, has certain advantages. With this method of control the compressor motor cannot start until the refrigerant entering the cooling coil has evaporated, and the coil pressure has built up to about 40 pounds, or the pressure at which the low pressure control switch has been set to trip and start the motor. The low pressure control switch permits the compressor to start with a lower motor starting load, than would be possible with a coil pressure, at starting, equal to the pressure at which the machine had pumped down to at the end of the previous operating period.

The time required between the closing of the thermostat circuit and the starting of the compressor with this method of control is not long, and usually does not exceed 10 to 15 seconds. The danger of liquid refrigerant entering the compressor is greatly diminished by the use of this type of control as the compressor cannot start until the refrigerant has sufficiently vaporized to raise the suction pressure to the setting of the low pressure control switch. This low pressure control switch is a necessary part of the control system when using a solenoid valve in the liquid line controlled by the room thermostat.

#### Fan Starts with Compressor

Although the inter-connecting of the fan motor and compressor motor circuits in such a manner that the fan will continue to run after the machine shuts down is not an essential part of the control system, it is very desirable that the fan and compressor start by a single operation. If the feature of automatically starting the fan with the compressor is not incorporated in the control, it is possible that the operator may start the compressor and forget to start the fan. This would result in a repeated starting and stopping, or re-cycling, of the compressor which, although it would probably do no damage, would unquestionably be annoying. There might also be danger of drawing liquid over into the compressor, even though a solenoid valve was used.

The control, as described above, was developed for experimental purposes, and probably is considerably more complicated than will be found necessary in most practical installations. As a matter of fact, the two-ton refrigerating machine used in this installation proved to have capacity so well balanced with the cooling requirements that there was no tendency toward over-cooling. After the compressor was started it usually ran continually until shut down in the

(Continued on page 58)



**Facts From Research Residence***(Continued from page 35)*

3.  $V_A$  is greater than  $V_B$ , since the velocity at the smaller section is greater than the velocity at the larger section.

4.  $S_A$  is smaller than  $S_B$ . In the case of an expanding duct section the static pressure decreases from A towards B. It is clearly evident that the difference in static pressures between points A and B bears no relation to the frictional resistance to the flow of air.

**When S. P. and T. P. Are the Same**

There are certain conditions under which the value of the static pressure at any given point is the same as the total pressure at that point. As may be noted from an examination of the pressure equation:

$$T. P. = V. P. + S. P.$$

the total pressure will be equal in magnitude to the static pressure only when the velocity pressure is equal to zero. See Fig. 6. This may be expressed in equation form as:

$$T. P. = 0 + S. P.$$

The above conditions will be approximately satis-

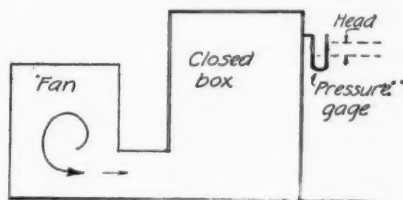


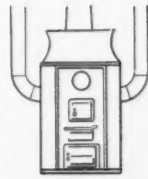
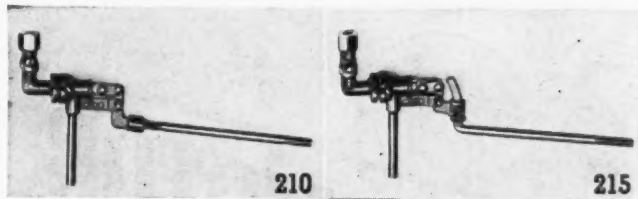
Fig. 6—A fan blowing air into a closed box builds up static pressure. Since no air velocity exists, the static pressure in this case is also equal to the total pressure.

fied in large plenum chambers where the air velocity may be practically negligible. In such cases, one may with sufficient accuracy for most purposes, use static pressure connections for obtaining total pressure values.

However, when the air velocity at any given duct section is appreciable, the value of the static pressure can not be used interchangeably with the value of the total pressure. The safest procedure in all cases, therefore, is to rely strictly on measurements made by the method shown in Fig. 1.

**When V. P. and T. P. Are the Same**

Similarly there are certain cases in which the velocity pressure and total pressure at any given point are the same. This condition is approached in practice at the outlet of a register, where the static pressure is zero. Consequently, if a rough approximation is desired of the total pressure at the register face, one may substitute for it the velocity pressure at the point. The latter may be calculated as shown in the abbreviated table which follows:



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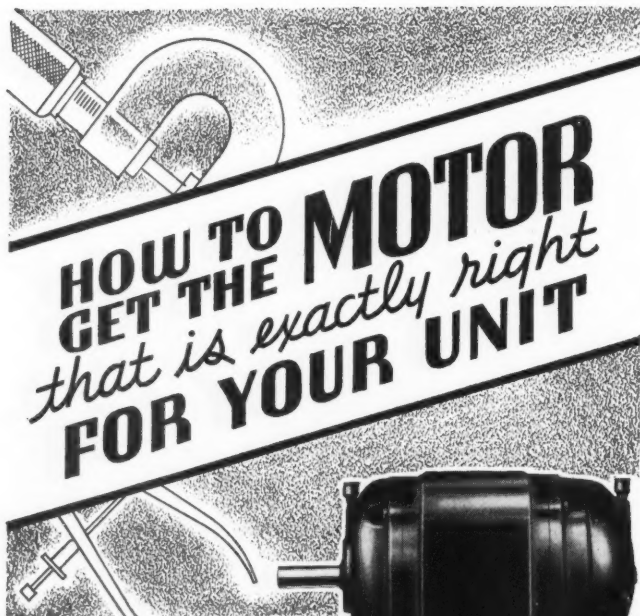
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**POLYPHASE**—Squirrel Cage . . . 1/2 to 15 H. P.  
Double Squirrel Cage . . . 3 to 15 H. P.  
**UNIT HEATER MOTORS**—All Types . . . 1/30 to 1/2 H. P.  
Standard Horizontal and Vertical Motors for all applications.  
Ball Bearings in all sizes. Sleeve bearing up to 2 H. P.

**BALDOR ELECTRIC COMPANY**

4358 Duncan Avenue, ST. LOUIS, MO.  
Sales and Service Offices in Principal Cities

**BALDOR**  
**A BETTER MOTOR**

TABLE I

Velocity Pressure Created by Air Velocity

Air Velocity		Velocity Pressure, Inches Water
Feet per second	Feet per minute	
0	0	0
2	120	0.001
4	240	0.003
6	360	0.008
8	480	0.014
10	600	0.022
12	720	0.033
14	840	0.044
16	960	0.058

Losses on the Suction Side

Up to this point we have considered the measurement of pressure losses only on the "pressure side" of a forced-air system. The pressures which have been considered have all been greater than the pressure of the surrounding atmosphere.

The measurement of pressure losses on the suction side of a system involve measurements of the "draft" or "suction," which is the pressure below that of the surrounding atmosphere.

The determination of the frictional resistance to the flow of air on the suction side of a duct system is rendered extremely difficult when one attempts to determine it by means of "static pressure" measurements. Without going into a lengthy explanation, it should be apparent from the preceding explanation that determinations of pressure losses on the suction side of a forced-air system should also be made only by means of a total pressure tube.

The measurement is made with the same arrangement as that shown in Fig. 1, except that it will be found necessary to change the rubber hose connection on the pressure gage from connection "a" to connection "b."

Determination of Pressure Losses

In the preceding discussion the method of making total pressure measurements was explained. The

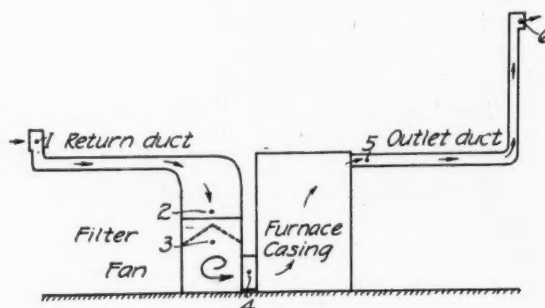


Fig. 7—Line diagram showing stations for observing total pressures in a typical forced air heating system. The numbers refer to stations.

diagram in Fig. 7 shows the location of pressure measuring stations for the determination of pressure losses in a typical forced-air heating system.

(Continued on page 58)

# Be ready for the first "cold snap"

If you're on the job—when the first really cold weather comes along this fall, you'll get a chance to sell quite a few H. V. A. Fans. Folks with warm air furnaces are your prospects, particularly where the furnace is old.

Tell 'em how an H. V. A. Fan will force heated air out of every register—show them how quietly the fan runs—estimate the installation cost—and you'll make some sales. Write for Bulletin 2919.

## BUFFALO FORGE CO.

497 Broadway, Buffalo, N. Y.

In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



**Sell  
"H.V.A." Fans for  
faulty Furnaces**

**Your  
customer  
will ALWAYS be  
Satisfied with a**

# MASTER HEAT REGULATOR

## Type B-22

*Two-position*

## MASTER

*Heat Regulator*



*Made by the Manufacturers of the famous Type B-144 the Original Gradual Control Heat Regulator.*

Your biggest market—the moderate salaried home owner—is after this kind of a buy. A noiseless, accurate regulator, made by a pioneer in the temperature control industry and at a price within his reach. This regulator is listed as standard by Underwriters

Laboratories, is easy to install, will give permanent satisfaction, and costs



**Only  
\$13<sup>50</sup>  
to  
dealer**

*It will pay you  
to get full details  
from*

**WHITE MANUFACTURING CO.**  
2362 University Ave. ST. PAUL, MINN.



## Hoffman Insulation

(Continued from page 29)

and having a warm-air furnace heating system that, according to the most careful calculations, had excess capacity but which failed to hold the room temperatures on a zero day to within 20° of the guarantee. The house had a heavy 18-inch stone wall to the eaves of the roof; consequently the trouble was above this horizontal plane. The house was of massive construction and no weakness was visible to the casual observer. There seemed to be no reason why such a heating system in such a house should not give satisfaction, until an examination of the attic revealed the fact that there was only one 8-inch board (foot-board) over the joists in each space, A and C, no flooring in B, and no sheathing of any kind on the room studs next these spaces. Above some of the first floor rooms, therefore, there was only the customary ceiling of 5/8-inch lath and plaster, and these rooms were depleted of their heat largely through the ceilings. Standing at the foot of the ornamental stairway one could feel a cold draft of air coming down from the second floor rooms although these rooms were supposed to be amply supplied with heat. The heating system was supposed to be faulty and had been frequently examined to determine the cause of the trouble. No one suspected that the house itself was the offender.

### Savings From Insulation

In the case in question, the reason for the omis-

sion of this small amount of flooring and sheathing was not the first cost but the lack of information concerning the subject on the part of both the owner and the builder. An expenditure of \$50.00 in No. 2 flooring, or fibrous insulation in bulk between joists, and fiber board or plaster board, for the floors and the walls, respectively, would have solved the discomforts of two years and saved many dollars in fuel bills.

As a corollary to the heat loss problem, any construction that keeps the heat in on a winter's day will also keep the heat out on a summer's day. It may be said that the comfort of the occupants in the summer time will in most cases be enhanced by such construction.

A striking case illustrating this was in a two-story frame house having a third story attic room about centrally located. This room had a warm-air heat supply entering through a floor register in the middle of the room, which should have supplied the room with ample heat for any winter weather, and it had a ventilating stack from the ceiling of the room through the roof with regulating damper. This room, however, was uninhabitable in the winter because it was too cold and likewise in the summer because it was too hot. Upon recommendation, the room studs on the attic side were sheathed and the space B was floored, at an expense of about \$50.00, and not only were the winter troubles entirely overcome but the room proved to be quite satisfactory in the summer time.

Many improvements on the usual lath-and-plaster combination may be made. Among them are the following, with probable rates of heat loss in B. t. u. per

# COOK HEAT CONTROLS

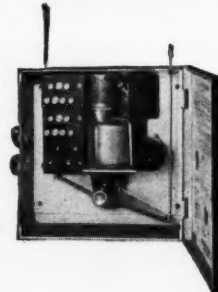
## GRAVITY - FORCED AIR - ZONE CONTROL



This Heat Control contains every desirable feature for the best operation of a domestic heating plant. Slow opening and closing of the draft and check door results in gradual changes in the combustion chamber.

### SAFE

Safety Features. In event of current failure, the COOK Heat Control will always close the draft and open the check door.



### QUIET

Quiet—There are no moving parts to lubricate; no mechanism to adjust; no motors, springs, gears or dry batteries. There is no service.

### DEPENDABLE

Regardless of how good your furnace and installation is, the success of the installation is entirely in the operation of the controls. The best is the kind you should use. Cook equipment will give your customer complete satisfaction, demand no service, and assure you a profit.



**COOK ELECTRIC CO., 2700 SOUTHPORT AVENUE, CHICAGO**

*Cook Equipment is Built to a Standard—Not to a Price*

# MORE PROFITS

## MORE SATISFIED CUSTOMERS

### WITH A

# CHAMBERLIN



## AUTOMATIC HUMIDIFIER

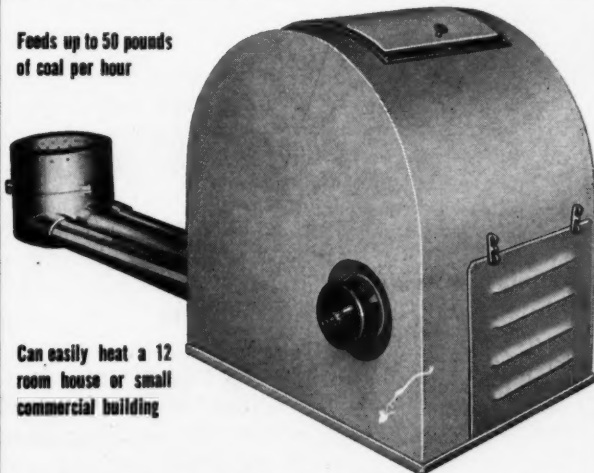
Your customers are rapidly realizing the necessity for proper humidity in their homes during winter months. Parched, dry warm air heat Quickly and Economically made Comfortable and Healthful. When you sell a CHAMBERLIN Automatic Humidifier, you sell HEALTH—COMFORT—FUEL ECONOMY. You also sell guaranteed merchandise. Successfully manufactured for 10 years. Made in one piece—either cast iron, baked enamel finish or cast aluminum. Valve entirely out of water. No back circulation of heated water to cause liming. Constant water supply easily connected and automatically controlled. Quickly installed in any furnace. Prices profitable for you; attractive to customers. Write for details.

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CEDAR RAPIDS, IOWA

## Here is a Small Stoker that "Can Take It"

Built Especially for Warm Air Heating

Feeds up to 50 pounds  
of coal per hour



Can easily heat a 12  
room house or small  
commercial building

The very latest in design. Sturdy in construction. Simple, quiet and economical in operation. Free from trouble and service.

With our stoker, you can now offer your customers automatic coal heat at a price they can afford to pay. It will solve your problem of meeting competition.

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Sidney Ohio

# TRANE

## EQUIPMENT



## FOR EVERY AIR CONDITIONING PURPOSE

No matter what type Air Conditioning system you may be interested in, TRANE Coils or TRANE Cooling Units will adequately fit the needs of your customer. Whether it be 1- the Large Capacity Cooler for big installations; 2 - the Climate Changer for residential work; 3-the Product Cooler for product storage; 4-the Propellor Unit for small store work; or 5 and 6- De Luxe Floor and Ceiling models for residential or office work you require or just TRANE Coils for central systems, you will find that they have been tested on recent installations and found satisfactory in every way. Why not check below the unit that interests you and write for complete information.

### SEND ME INFORMATION REGARDING

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|-------------------------|----------------------|
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| 2. Climate Changer      | 5. Cabinet Cooler    |
| 3. Product Cooler       | 6. De Luxe Cooler    |

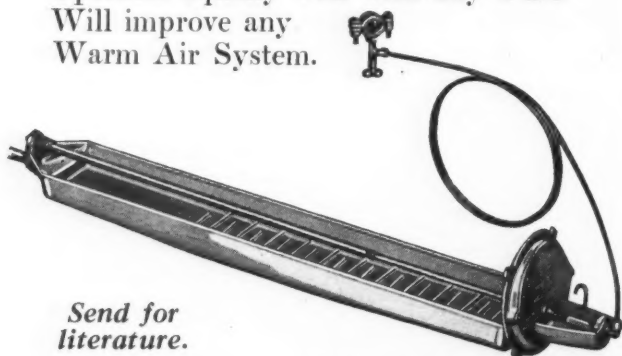
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Address \_\_\_\_\_ State \_\_\_\_\_

**THE TRANE COMPANY**  
LA CROSSE, WISCONSIN

## THE WISCONSIN HUMIDIFIER

is neither "Drip" nor "Float" type. It is the **ONLY HUMIDIFIER** that supplies moisture **AUTOMATICALLY** in **CORRECT PROPORTION** to the heat generated. Easy to install—No service calls. Not affected by Hard Water or changes in Water Pressure.

Operates equally well with any Fuel.  
Will improve any Warm Air System.



Send for literature.

**WISCONSIN HUMIDIFIER CO.**  
3231 No. Richards St. Milwaukee, Wisc.



For furnace manufacturers who buy wheels only, Clarage offers any size desired, and can meet any quantity requirement. Clarage Wheels can be furnished standard width, or any percentage of standard width to deliver a specified volume of air at any operating speed. All wheels are **PERFECTLY BAL-**

**ANCED** for quiet operation without vibration. Clarage Furnace Fans (complete assemblies) combine many advantages. They are positive centrifugal type, very compact, highly efficient, and the low speeds insure **SILENT OPERATION**. Inlets and outlets are drilled with holes for easy attachment to ducts.

Clarage Fan Company, Kalamazoo, Michigan

**CLARAGE**  
Air Handling and Conditioning Equipment

hour, per square foot of surface for each degree difference in temperature between the two sides of the material.

### CEILING TYPES

K

- |   |      |
|---|------|
| 11. Lath-and-plaster, without floor on joists (Fig. 14).....  | 0.50 |
| 12. Lath-and-plaster, with 13/16-inch floor on joists (Fig. 17).....  | 0.24 |
| 13. Lath-and-plaster, with 1/2-inch Cabot's Quilt or equivalent, tacked between joists (Fig. 18) .....                        | 0.19 |
| 14. Lath-and-plaster, with 3 1/2 inches of rockwool or equivalent, between joists (Fig. 19) .....                             | 0.10 |
| 15. Semi-pressed fiber-board and plaster ceiling, no floor on joists.....   | 0.32 |
| 16. Semi-pressed fiber-board and plaster ceiling, with floor on joists.....   | 0.19 |
| 17. Semi-pressed fiber-board and plaster ceiling, with 3 1/2 inches of rockwool or equivalent between the joists (Fig. 19) .. | 0.07 |

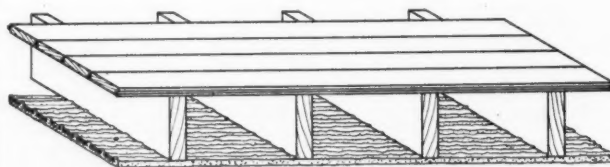


Fig. 17

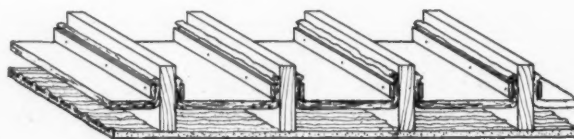


Fig. 18

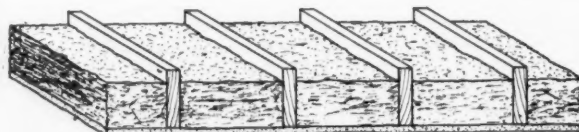


Fig. 19

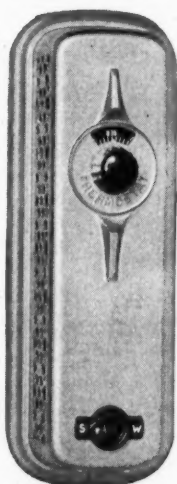
Other combinations may be made, but the ones stated are frequently used and can be recommended.

Roof insulations may be made by surfacing under the rafters with fiber board or quilt; by surfacing under rafters with fiber board and filling the spaces above with hairfelt, rockwool, or equivalent; by filling in between the rafters with cut strips of quilted insulation; or by putting fiber board or quilt between the outside sheathing and the rafters. One of the most effective insulations at moderate cost is obtained by having fiber board below the rafters and hairfelt, rockwool, or equivalent between the rafters, quite similar to wall insulations.

If all the attic space is to be used for living or play purposes, then the simplest way is to insulate the roof and merely floor the attic. If the attic is not an important factor with regard to comfort, then the stress should rather be laid on the floor-ceiling combination.



## SUMMER-WINTER THERMOSTATS



A single instrument instead of two for the automatic control of cooling equipment in summer and heating equipment in winter, by means of manual switch built into case and ready-interwired. The snap-acting, spring blade contacts insure freedom from chatter and vibration. Total differential of only 1° F. Equally suited for low or line voltage. Beautiful in design. Satin Silver or Bronze finish in anodic Alumilite, and therefore unaffected by acid or alkaline corrosion, scratches, etc.

TYPE T/5W—Used to give reversible cycling on 2-wire control circuits.  
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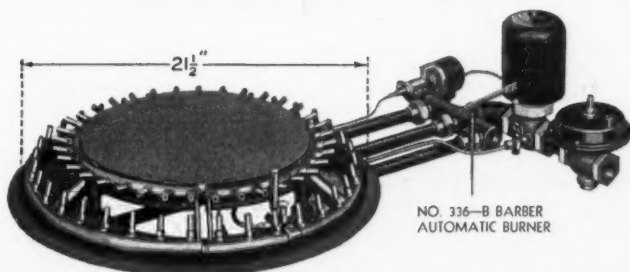
TYPE T/45—Used to operate TWO SEPARATE LOADS.  
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Apply for details of our complete line of instruments for control, indication, and recording of air conditions for all purposes. Attractive Bulletins on request.

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Baltimore, Maryland

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NO. 336-B BARBER  
AUTOMATIC BURNER

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## BARBER *Automatic* JET GAS BURNERS

for Warm Air Furnaces,  
Steam and Hot Water Boilers

## MONARCH SPRAYS

## FOR OIL



Fig. F-27

Monarch Fig. F-27 stainless steel nozzles are furnished as standard equipment on most pressure type domestic oil burners. Capacities from 1.08 to 30.00 G.P.H. @ 100 lbs. No. 2 furnace oil.

Bulletin No. 20

## FOR AIR WASHING

For industrial air washers we recommend either 1/4" Fig. 631 (female) or 3/8" Fig. 629 (male pipe-illustrated) Brass nozzles. Size delivering 68 G.P.H. at 20 lbs. is recommended.

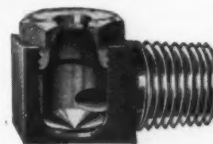


Fig. 629

Catalog 6-C

## FOR AIR CONDITIONING



1/4"  
Fig. H-261

For this work we recommend either the Monarch 1/4" Fig. H-261 male or Fig. 642 female pipe thread Brass nozzles. These nozzles break the water up into the finest spray possible using direct pressure. Capacities from .57 to 18.17 G.P.H. @ 40 lbs. The 2.20 gal. size at 25 lbs. is mostly used.

Bulletin No. 20

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## LOOK! A NEW MODEL LAU BLOWER

500 Series — Six Sizes

### NEW SHAPE

All sizes 29-in. front to back, pass through 30-in. door without dismantling.

### COMPACT

Permits installation in very small space.

### FILTER FRAMES

Special . . . prevent air leakage.

### ACCESS DOORS

Full size door on each side.

### MOTOR

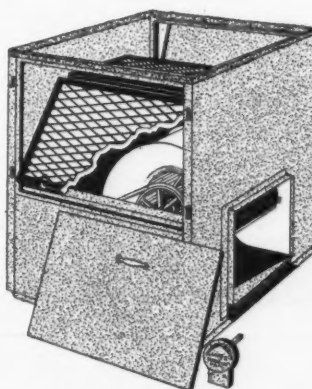
Can be placed on either side . . . on the job.

### BLOWER

A centrifugal blower, not a fan. Absolutely silent.

### FINISH

Beautiful green baked Morocco.



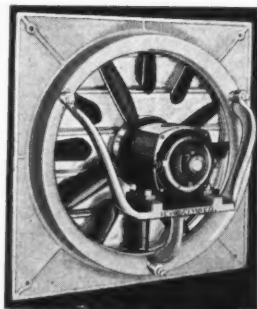
Complete with Furnacestat, Motor, Filters, Blower Cabinet, Drive, Blower and Two Full-Size Access Doors.

For performance, ease and flexibility of installation, beauty and profit possibilities, here is the blower. And NOW is the time to sell it. Write at once for full details . . . it's a winner!

**LAU HEATING SERVICE, INC.**  
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## INDUSTRIAL and HOME VENTILATION

International Fans are silent . . . higher cfm of free air . . . particularly efficient against static resistance . . . a superior line of propeller fans in every respect.



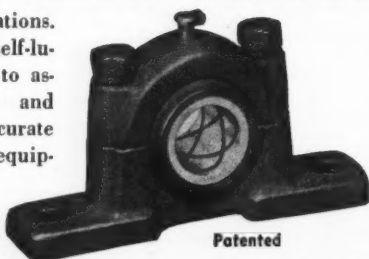
Go after business with International. Full information and prices will be forwarded on request. Write now.

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## ONLY... RANDALL PILLOW BLOCKS

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You always have a happy feeling about a job when you use Independent "Fabricated" Registers and Cold Air Faces. You can be sure they will please the owner. Remember—82% Open Area.

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REGISTER AND  
MFG. CO.**

3741 E. 93d St.  
Cleveland  
Ohio

## The Maytag Hotel

(Continued from page 32)

main floor of the hotel control the starting and stopping of the system. Once started, the system functions automatically, governing itself in such a way that proper temperature and humidity conditions are maintained in the sections served.

Anemometer tests run in the public and guest rooms show that the system does not create even a slight draft.

The sheet metal contractor who installed the system is the Capital City Sheet Metal Works of Des Moines. Ten weeks were required for the work, according to an agreement drawn before work started. To maintain the schedule mechanics averaged twelve hours work a day, much of this in the evening, but no work after eight o'clock in order not to disturb guests. Also no work was done on Sunday.

### Interesting Problems

According to the contractor—"The installation required some 33,000 pounds of galvanized iron of 18, 20 and 22-gauge. The workmen usually started around seven o'clock in the morning and worked according to a rather complicated schedule.

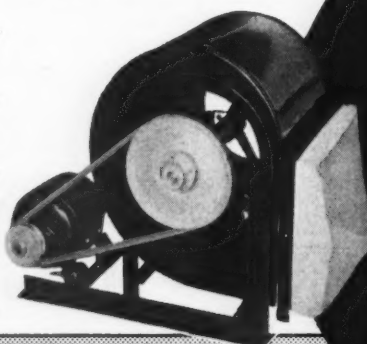
"The foreman scheduled the work the day before. His aim was to select a group of rooms adjoining one another on one floor and to make arrangements with the hotel to get into these rooms the next day. All measurements for the work to be done the next day were taken to a shop in the hotel basement where the pipe sections, fittings, and other metal work were cut and fabricated prior to the day of installation.

"Then as early in the morning as possible the workmen entered these rooms and covered the room completely so that no muss would be made. Holes for the grilles were cut and the faces and boxes installed and connections made to the supply ducts. By evening the rooms were finished and the covering removed making the room ready for occupancy.

### Scheduling Work

"Sometimes the schedule was broken up in such

★ GET THE FACTS ABOUT



## Peerless BLOWERS

Belt driven furnace blowers equipped with silent floating power and an automatic belt tension device.

Also, direct drive blowers, single and variable speed, with no belts or pulleys. Leading air conditioning and furnace manufacturers use Peerless blower equipment. There is a wide range of types and sizes—write for details, prices, etc.

We also supply motors, wheels, and other parts independently.



**PEERLESS ELECTRIC CO.**



**WARREN, OHIO**



a way that two or three hours' work could be done in one room, then a few hours in another location. At first this caused some confusion, but as the work went along the mechanics entered into the spirit of the job and took real pride in so doing their work that the most upsetting break did not prevent them from getting in a full day's accomplishment on the schedule.

"Those reading the description of the work and examining the drawings will appreciate how really confusing this installation might have proved to be without this cooperation on the part of the mechanics. The fact that the machines are remote from the rooms served and that branches had to be dropped down through partitions and closets, with accompanying difficult fittings in order to direct the air as it should go, could have destroyed the time schedule had not everyone cooperated to the fullest extent.

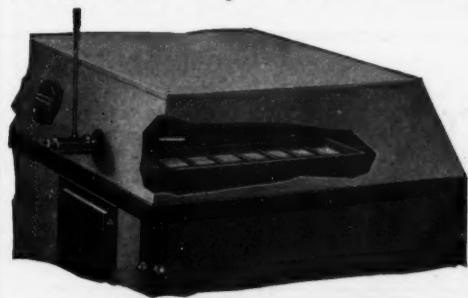
"As the drawings show, there are several points of real interest in the metal work. The typical floor plan shows how the branches were brought to the registers, usually in two-room runs and by the use of "Y" fittings one branch was made to serve two registers. In only a few instances was a major change in the room required. Each of the "Y" branches had to be measured and fabricated separately.

#### Hanging Metal Work

"The metal work in the attic, where the machines for the guest rooms are located, consists of large sectional ducts carried along the attic ceiling from the machine pent houses. The machines in the basement which serve the public rooms, were connected to their supply registers by ducts carried through the basement and brought up as close to the register as possible. Due to space limitations some really complicated metal work was required, but by carefully planning and layout we were able to get the large amount of metal into the space allotted.

"On the first floor several ducts had to be carried through service rooms and corridors, but no major alteration was required in the rooms served. The whole installation proved a most interesting project and contained sufficient surprises to keep us on our toes at all times."

#### The Humidifier that Satisfies is the Automatic Drip. Heat Controlled.



Made in  
Sizes for All  
Furnaces

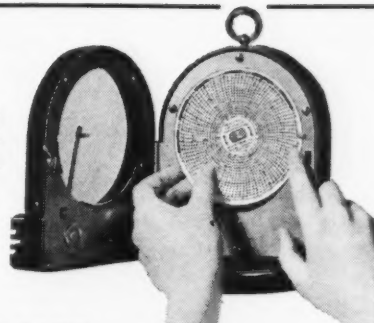
New Low  
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Humidifier  
for Steam and  
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Plants

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Practical  
Thermometer  
helps you sell



#### How to PROVE heating performance

Many times, you will turn balky prospects into customers if you prove the heating performance of your equipment. And a Practical Recording Thermometer gives you this proof. Easily. Convincingly. For it makes a chart record of temperatures which proves your case. Your prospect understands that the chart is authentic and believes it. Therefore you sell him.

Practical Thermometers—and the charts they make—are in use daily by hundreds of dealers. They use them to check installations, forestall complaints, make records of service work and help in collections. In fact there are 14 ways you can use a Practical Recording Thermometer.

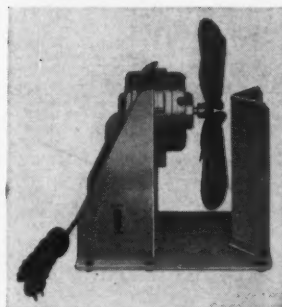
#### Write for Trial Offer

Send a postcard or letter to get complete information: 15 Day Trial Offer, List of 14 Uses, Low Prices, Discounts, Terms, Sample Chart, Illustrated Description, Temperature Ranges.

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2717 N. Ashland Ave., Chicago

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#### FURNACE BOOSTER FAN



Every warm air gravity heating system needs this compact unit! Insures increased efficiency in heating systems that are not working satisfactory! There are real opportunities for BIG PROFITS this season with the AUTO-VENT Furnace Booster Fan. Write at once for complete facts and figures!

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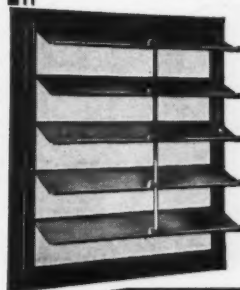
#### "ELGO" PROTECTION—

#### FOR FANS AND BLOWERS!

Elgo Automatic Shutters operate by gravity. They are fool-proof . . . they protect fans from all the dangers of the elements, assure finer operation, and add years of service to any fan or blower that they service. Elgo Shutters are designed for use with Propeller or Disc Fans, Impellers or Blowers, and are endorsed by leading ventilating engineers and contractors.

Full information will be sent upon request.

**Elgo Shutter and Manufacturing Co.**  
Detroit, Michigan

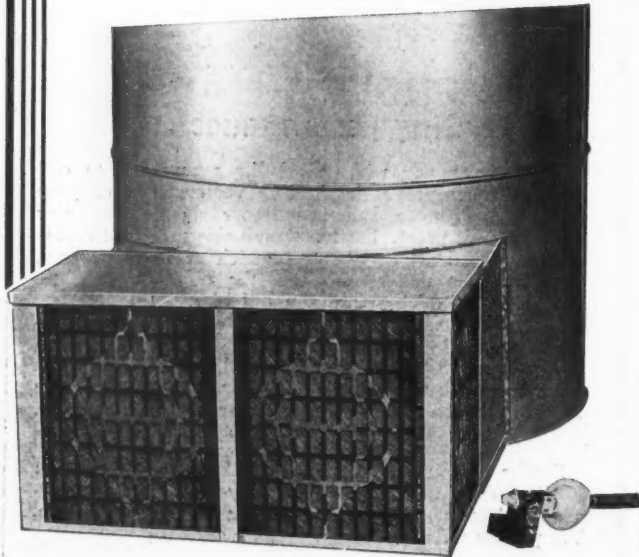




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## AIR CONDITIONER BOOSTER

POWERED BY EMERSON



- NEW IN DESIGN
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- ENGINEERED FOR EFFICIENCY
- PRICED TO SELL

**G**IVES you something distinctive to present to your customers . . . an air conditioning booster that will help eliminate unevenly heated rooms, save on fuel costs, and circulate clean fresh air throughout the house summer and winter.

The Osborn Air Conditioner Booster comes packed in COMPLETE PACKAGES and includes 4 Dustop Filters, Automatic Fan Switch, Safety Draft Regulators, Cabinet complete and an Emerson Furnace Fan. It is easy to install, and once installed will give years of trouble-free service. It is not expensive, but each installation will yield you a nice profit.

Sell with the times . . . sell modernization . . . sell Osborn equipment.

HEADQUARTERS FOR AIR CONDITIONING EQUIPMENT

THE J. M. & L. A.  
**OSBORN Co**  
—DISTRIBUTORS—

DETROIT • CLEVELAND • BUFFALO

It doesn't seem possible that this young lady breathes more than 66,000 billion dust particles a year, yet it is true.

If you were to assemble the dust particles she breathes in a lifetime, they would be many times her volume. The answer is Dustop.

*Here's a dramatic Sales Argument*

## THAT MEANS MONEY TO YOU

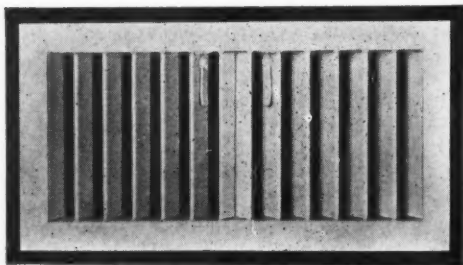
● Do you know that we breathe 190,000 cubic feet of air a year and that this amount of air, on an average, contains 66,000 billion dust particles? "Incredible", you say, and especially when you realize the many billions of disease germs, filth and hay fever pollen that are carried by this amount of dust. Much of our life is spent indoors. That means that much of the air we breathe can be cleaned. *There's a whale of a sales story.* Sell clean warm air

and sell Dustop replacement-type air filters. America is becoming more and more dust conscious. Here's an opportunity to cash in on a great market that's advancing by leaps and bounds. Owens-Illinois Glass Company, Industrial Materials Division, Newark, O. Distributors, carrying complete stocks of DUSTOP replacement filters, located in all principal cities. (Dustop is assembled and installed in Canada by General Steel Wares, Ltd., Toronto.)

*Sell Clean Warm Air*

OWENS-ILLINOIS **DUSTOP** AIR FILTERS

# Positive CONTROL of AIR DIRECTION 1-2-3-4 Ways



in the new Venetian Blind Effect

## WATERLOO *Air Conditioning* REGISTERS

No matter what, or how many, air directions are required, there is a Waterloo Air Conditioning Register to meet the exact need . . . Quadri-Flo (4 way), Down-Flo and Tri-Flo (3 way), Twin-Flo and Single-Flo. The louvre sets operate as units under lock control, sending air right, left, up or down.

### Tested Capacities

The capacity of Waterloo Air Conditioning Registers is now registered for you accurately—you KNOW what to count on. These capacity guides are contained in the new Toenjes-Waterloo Performance Charts (Size-O-Graphs), a practical method of selecting the proper size register for every job.

### PLUS--

Slanted louvres that provide Venetian Blind appearance, harmonizing with modern vogue in interior decorating; duct-concealing; no annoying "register noise."

No other registers on the market offer such beauty, style and exclusive, TESTED mechanical advances. Specify Waterloo.

### Send for New Catalog

New designs, new charts and installation data, profusely illustrated. Tear out this signature and write for your copy today.

### The Waterloo Register Company

Floor Registers, Floor Cold Air Faces, Base-board Gravity Registers, Wall Registers, Steel Grilles, Wood Faces and all furnace supplies.

Waterloo, Iowa — Seattle, Wash.

In New York—Air Conditioning Utilities, Inc.  
489 Fifth Ave.

In Los Angeles—California-Waterloo Register Co.  
824 Clanton St.

# FURNACE BLOWERS

Single, double, triple and quadruple assemblies, for use in ventilating and exhaust systems.

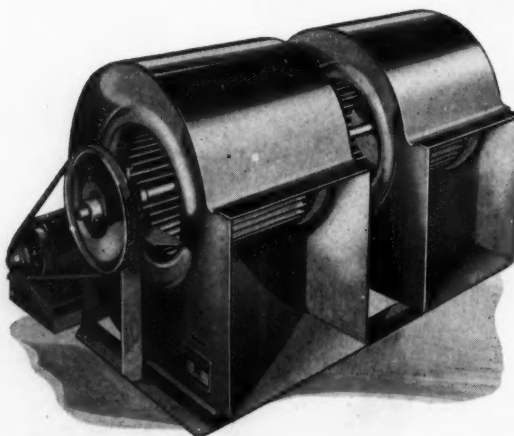
These blowers are designed and built for use with domestic warm air furnaces, but they can be used equally well for cooling and ventilating purposes in small theatres, retail stores, etc.

The fan wheels are of strong welded construction and are given a careful dynamic and static balance assuring quiet operation. The housings are die formed and of welded construction available for any angle of discharge.

The units can be furnished with drip pans and casings for mounting and housing cooling coils when mechanical refrigeration is to be used.

From the five standard sizes various combinations can be made up to deliver practically unlimited capacities.

Write for complete information.



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**BISHOP & BABCOCK** Sales Co.  
CLEVELAND, OHIO



For your convenience a number has been assigned each item. Check the items in which you are interested on the coupon on page 68 and mail to us. Complete information will be forwarded.

● Indicates product not listed in 1935 Directory

△ Indicates product and manufacturer not listed in 1935 Directory

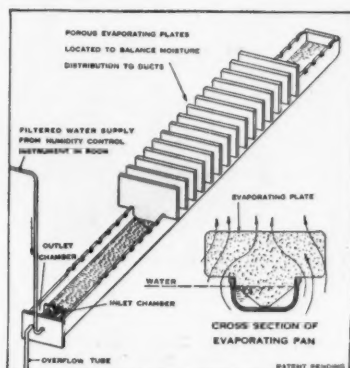
# NEW PRODUCTS

## 188—Humidifier

A new humidifying system for warm air heated homes being placed upon the market employs a humidifying pan of vitreous enamelled cast iron only 2½" wide designed to slide into the dome of the furnace. To secure adequate evaporating surface a series of porous porcelain plates are placed crosswise in the pan.

The number of evaporating plates may be increased or decreased to suit the evaporative capacity required. Up to 30 plates may be used which will give evaporation equivalent to a pan 28 inches wide by 35 inches long.

The pan has no valves of any kind, the flow of water being controlled entirely from a wall instrument located in the living room. When the pan is filled to capacity, surplus feed water will be by-passed.



The trade name of this system is "Automatic June." The manufacturer is the Monmouth Products Co. 231 East 131st of Cleveland.

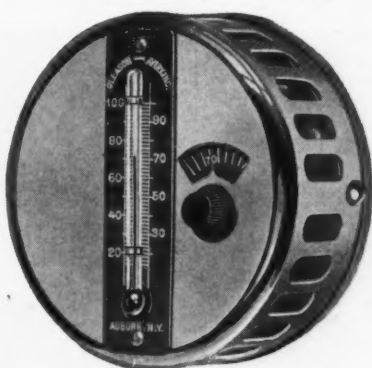
## 189—Packaged Blower

American Machine Products Company, Marshalltown, Iowa, announce the Am-Pe-Co Unipack blower, a moderately priced unit that is said to be as noiseless as the Am-Pe-Co rotary and air washer-blower units. The features are moderate price, small size and easy installation on existing gravity furnaces. The new unit will be furnished in six sizes rating from 1225 to 2690 C. F. M. against 1/16-inch static pressure. The largest unit is rated at 1850 C. F. M. against 3/8-inch static pressure. Standard equipment includes a motor, filters, pulleys, V-belts and necessary canvas connections.

## 190—Controls

Gleason-Avery, Inc., 27 Clark St., Auburn, N. Y., announce a new transformer-relay and a low voltage snap-action thermostat.

The transformer-relay is an Underwriters' Approved device listed for 110 volt, 60 cycle A. C., 1 phase, ½ H. P., 3 wire 25 volt control circuit, so con-



structed that contact can be made on either rising or falling temperature or both.

The thermostat is said to be sensitive to slight temperature variations. Setting is by means of a radio type dial.

A Dual Thermostat used with the company's time switch will automatically maintain different day and night temperatures.

## 191—New Register

A patent has been granted to James W. Bergstrom, head of the Bergstrom Manufacturing company, on a new type of wall register.

The invention so forms a register head fitting that a uniform flow of air is secured from the opening and a tight fit between the walls of the register head and the register itself is formed, preventing air leaks which tend to mark the walls of a room.

The new register is said to overcome the difficulty of having approximately one-third of the total height of the face "dead" so far as discharge of air is concerned and back drafts through the lower portion of the opening occur.

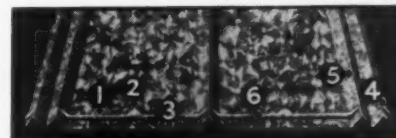
The new wall register is designed especially for forced air, but it is adaptable on gravity, indirect steam and hot water systems.

## 192—V-Crimp Roofing

A new galvanized 5V crimp sheet metal roofing, known as GLOBE DRI-LAP, has been patented and introduced by The Globe Iron Roofing & Corrugating Company of Newport, Kentucky. The new roofing, according to the manufacturers, embodies these improvements: the Air Lock Bead (1), rolled horizontally across the sheet one inch up from the lower edge, overcomes the force of capillary attraction by placing an air lock in the path of the water as it seeps upward between sheets at the laps. A Nail seat (2) which provides for additional nailing, eliminating unsightly openings at the laps and making a tighter roof. The Snug-Fit Edge (3) which is the lower edge bent down ¼ of an inch and results in a tight contact between sheets at the laps.

A continuation of the Air Lock Bead is rolled into the outer crimps, forming the Self-Aligning Ridge (4).

Since there is no change made in the crimps themselves (5), the new GLOBE DRI-LAP Roofing matches with any standard 5V crimp roofing,



and the Air Lock Bead adds another horizontal line across the courses (6), adding to the appearance of the finished roof. GLOBE DRI-LAP Roofing is available in all standard sizes.

An ingenious demonstration kit shows what actually happens on a sheet metal roof when it rains. Two flat pieces of glass are used to imitate ordinary roofing. When water strikes the overlap of the glass, it is drawn upward by capillary attraction. However, when a piece of glass with a V-groove cut across the end to simulate the Air Lock Bead is used, water rises only as far as the bead because the force of capillary attraction is broken.

## 193—Domestic Stoker

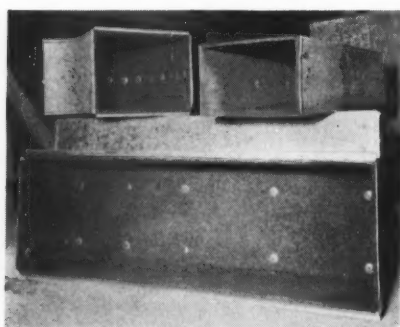
Link-Belt Company, 2410 W. 18th Street, Chicago, announces the addition of household anthracite automatic stokers to the line of bituminous coal burners. Three sizes are available, with maximum coal feeds of 25, 35 and 50 lbs. per hour.

# New Products . . . . .

## ● 194—Acoustic Sheets

Air-Acoustic sheets, a new product designed to reduce or eliminate the noise transmitted through ducts in air-conditioning and ventilating systems, have been announced by Johns-Manville.

These sheets are a sound-absorbing material in rigid block form made of rock wool and a suitable binder and are primarily used as duct lining. Because they will not smoulder or sup-



port combustion, they are recommended for all installations where combustible or merely "fire-resisting" materials would contribute to the fire hazard.

The sheets are highly moisture resistant, have good sound-absorbing efficiency and their thermal conductivity is such that they serve as heat and cold insulation as well as sound absorption layers. They are attached to duct surfaces either by spot cementing with acoustical cement or by mechanical fastenings.

## ● 195—Lightweight Drill

The lightweight portable electric drill, weight 2½ lbs., but with a claimed power of tools twice its size, has just been introduced by the Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago. This new tool, the U-14 in the ¼" capacity and the U-13 in the 3/16" capacity, is half the size and weight of other drills of the same power, but will drill through steel ¼" thick in 5 seconds. It fits easily in one hand.

Ball bearings and accurately machined, heat-treated helical gears reduce noise and vibration to the minimum and increase motor efficiency. These same features also reduce heat generated, extremely important in a tool of this size.

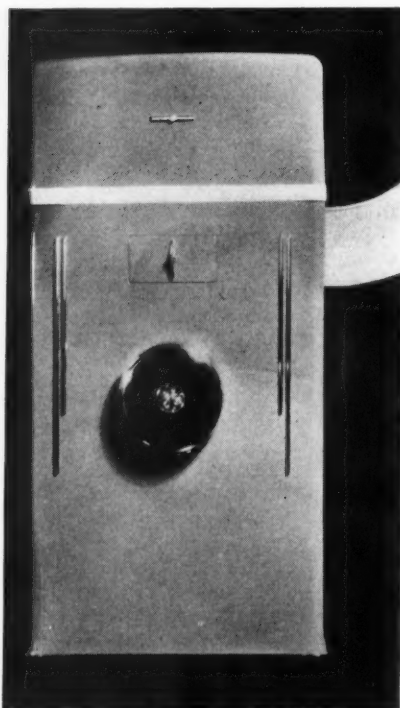
Specifications: U-14 Capacity ¼" drilling; Free Speed R. P. M. 2500; Weight 2½ lbs.; Length overall 6¾"; Equipment Jacobs Chuck and 1 Extra Set of Brushes; Spindle Offset 1". U-13 Capacity 3/16" drilling; Free Speed R. P. M. 3750; Weight 2½ lbs.; Length Overall 6¾"; Equipment Jacobs Chuck and 1 Extra Set of Brushes; Spindle Offset 1".

## 196—Furnace

General Electric Company announces a new direct-fired warm air conditioner, combining the functions of heating and air conditioning in one compact oil-burning unit designed for the small home of about six rooms.

The principle of impact expansion atomization is incorporated in the new unit. The oil is broken into a fine mist, effecting complete combustion of the lower grade fuel oils in which the heat content is greatest. The flame burns downward and the flue is at the bottom.

The new unit has a heat rating of 133,000 B. t. u's per hour, and will deliver and properly circulate approximately 1,680 cubic feet a minute of cleaned, humidified, tempered air. Not less than a gallon of water per hour



will be used to give adequate humidification in cold weather. A hot water supply heating coil and also a cooling unit will be available for use with the new unit.

The unit is housed in an attractive rolled sheet steel jacket in two-tone gray, with black and chromium trimmings. Standing 5' 6" high, it occupies but 2' 9" by 5' 7" of floor space.

## ● 197—Window Filter

The Model 40-A Airgard announced by the American Air Filter Company, Inc., Louisville, Ky., the fourth in a line of Airgard Window Filters first introduced in 1929, is a self-contained ventilating system including variable speed motor, double blower type fans and an Airmat Drifilter, enclosed in an attractive cabinet. It is easily in-

stalled in any sliding window and provides controlled ventilation for a single room or office. It eliminates dust, drafts and street noises, assures a fresh, clean, quiet indoor atmosphere at all times.

The new "finger-tip" damper control makes it possible to regulate the volume of incoming air to the exact amount required to correct the condition without imposing an excess load on the unit. The cabinet is wood, finished in natural walnut or ivory. The filter contains 14 square feet of filtering surface.

## 198—Blower

The new model AIR-PAK, a blower-filter unit for forced air heating and conditioning, manufactured by Air Controls, Inc., of Cleveland, is a packaged unit having an attractive red casing which comes in panels that one man can assemble in less than ten minutes by a patented method—without screws, bolts or slip joints. A feature of this casing is the removable back which permits cool basement air to be drawn through the filters for summer use.

The streamlined, low speed blower is exceptionally quiet and free from vibration. All moving parts are rubber



mounted. The self aligning bearings are quiet and free running and require oiling once a year. Refrigeration type motor and V belt drive are used. The large size of the filters, their efficiency, and unique placing provides more filter area, insures long life and dependable service.

The AIR-PAK is equipped with the Miles Patented Automatic By-Pass Louvres which permit unobstructed circulation by gravity when the blower is not running, reduces stagnation of air in the rooms and reducing the risk of an overheated furnace.

## 199—Oil Burner

The Micro Corporation, a subsidiary of the Bettendorf Company, Bettendorf, Iowa, announce the Bettendorf new model G, a competitive priced oil burner. The new burner is of the gun type and comes fully equipped with all the necessary controls. Full details of the design and construction of the new burner is contained in a four-page leaflet which may be obtained from the company.



# ASSOCIATION

# ACTIVITIES

## New York State

The New York State Sheet Metal and Roofing Contractors' Association has placed in the mails the August, 1935 bulletin. The bulletin carries some discussion of the Washington super-lobby maintained by chain store organizations. The bulletin reports statements by National Representative Pattman. We are making an appeal to contractors to patronize only those manufacturers who definitely do not sell the mail order houses.

The New York State Association is giving considerable attention at this time to the competition from coal dealers. As stated in the bulletin, manufacturers are getting requests from coal dealers for cleaning apparatus, control apparatus and even furnaces or heating units. Some of the manufacturers (we quote a letter from Peerless Foundry Co., Indianapolis) have definitely stated that they do not wish to sell the coal dealer, while others are selling to the coal dealer trade in some areas. The New York State Association believes that this situation is becoming serious and should be considered by most of the active associations.

A condition has been brought to the attention of the New York State Association on which action will be taken relative to the installation of air conditioning systems by oil burner specialty agencies. Examples of trouble accruing from such practice are being reported and the association intends to see what it can do to keep air conditioning within our industry. The co-operation of other associations and individuals is solicited.

Adolph Hesse, Secretary.

## St. Louis

On August 23 the Central Furnace and Stove Repair Company of St. Louis, were hosts to the Associated Sheet Metal, Air Conditioning and Heating Contractors of St. Louis, Inc., and also to all contractors in the St. Louis area. In addition to contractors from the St. Louis area representatives came from St. Louis County, Alton and East St. Louis and Southern Illinois. C. O. Johnson, credit manager of the Joseph T. Ryerson Company, St. Louis, acted as chairman of the meeting and delivered a short discussion on bookkeeping, cost accounting and general business control. Mr.

Johnson has developed some highly interesting and valuable methods of figuring overhead and keeping track of costs. T. Reid Mackin of the International Heater Company and D. C. Ellison of Northwestern Stove Repair Company, Chicago, also addressed the meeting; Mr. Ellison delivering an interesting talk on general business conditions.

## Columbus, Ohio

A survey recently made by the Sheet Metal Contractors' Association of Columbus, Ohio, indicates that general business seems very much improved in Columbus and the surrounding territory. The district is enjoying a considerably increased amount of business activity—much more than has been noticeable during the last five years. All indications point to a busy fall season.

F. G. Mirick, Secretary.

## DuPage County

Most of the members of the DuPage County Warm Air Heating and Sheet Metal Contractors' Association seem to have a very generous amount of work on hand this fall. In most communities where there has been any building activity at all during the past summer shops have sold at least one winter air conditioning system and in some cases more than one installation. In many cases these installations are the first such which the industry has been able to make because of the lack of new building construction. Remodeling, repair and renovizing work is proceeding at a good pace throughout the area and contractors are receiving a very generous share of the amount of money being spent in repair and remodeling work.

J. E. Peterson, Secretary.

## Wisconsin

Members of the Sheet Metal Contractors' Association of Wisconsin, whose principal work consists of furnace repairs and remodeling installations, also sheet metal replacements and repairs, seem to be enjoying an unusually good fall and early winter season. However, those contractors whose principal work is in fair or large sized projects are not enjoying any appreciable increase in work.

Reports from all parts of the state

indicate that requests for figuring jobs have been unusually numerous this past summer and fall, but that too large a percentage of such work never materializes.

During the last thirty days there has been a noticeable spurt and increase in business in Milwaukee and throughout the State, as a result of which most of the members of our association are rather optimistic and are looking forward to a good fall and winter season. Paul L. Biersach, Secretary.

## Chicago

The South End Sheet Metal Employers' Association of Chicago has been viewing with considerable interest the reports of increased business from various parts of the country. However, the South End Association believes that a volume of business without a livable return for both the employer and the employee has little significance and feels that this condition exists at the present time.

The return of prosperity is being hampered by excessive taxes, the incurring of large national, state and local debts. The increase in living costs, particularly in the larger cities, contrasted with today's scale of wages, would seem to indicate that radical social and political changes must be made.

Our association does not believe that its members should be misled into a sense of false security and that every member should give serious consideration to probable consequences of present legislation. The only solution, as we see it, lies in active co-operation with associations by every member of the industry.

J. A. Miedema, Secretary.

## Springfield, Ohio

The period between July 15 and August 15 is ordinarily the worst season for our industry. The years 1933 and 1934 probably marked the lowest point in the sales chart. 1935 is showing an improvement over 1934 of approximately 25 per cent. While the Master Sheet Metal Workers' Association of Springfield does not consider this 25 per cent increase sufficient to lift the industry out of the depression, it is most encouraging and indicates to our membership that conditions in general are on the upward trend.

Charles F. Hauck, Treasurer.



## Automatic Controls

(Continued from page 42)

evening, and the thermostat proved to be rather unnecessary. Of course the advantage was enjoyed of knowing definitely, by virtue of previous experience with ice cooling, the cooling requirements of this house, and it was possible to choose a compressor with just the right capacity.

### Advantages of Manual Operation

It is the writer's belief that if the present tendency of designers and manufacturers to over-estimate the cooling requirements of a home can be modified, and if they can be persuaded to think in terms of "comfort cooling" instead of so-called "ideal air conditioning" with the reduction of temperatures to a point too low for comfort for many people, thermostat control can be dispensed with. There seems to be no reason why, in most homes, the control equipment could not consist simply of a push button located at a convenient point, and connected to start and stop the fan refrigerating machine by manual control with a single operation. If it is desired to operate the fan at periods when the compressor is not running, then, of course, a second push button will be needed.

It is believed that the tendency in residential installations will be toward this type of simplified control. In other words, while the control system in this experimental installation was developed with the object of making this system as completely automatic as possible, it is doubtful whether the expense and complication required to accomplish this are warranted.

## Facts From Research Residence

(Continued from page 44)

By means of the pressure measuring instrument similar to that shown in Fig. 1, the magnitude of the total pressures are determined at stations 1, 2 and 3 on the suction side of the fan, and stations 4, 5 and 6 on the pressure side of the fan. It should be noted that the total pressures at stations 1, 2 and 3 are less than atmospheric pressure, and hence the hose connection in Fig. 1 should be at "b." On the other hand, the total pressures at stations 4, 5 and 6 are greater than atmospheric pressure and the hose connection in Fig. 1 should be at "a."

### What Readings Mean

The difference in total pressure between stations 1 and 2 gives the frictional resistance to air flow in the return duct system; whereas, the difference in total pressure between stations 2 and 3 gives the pressure drop through the air filters.

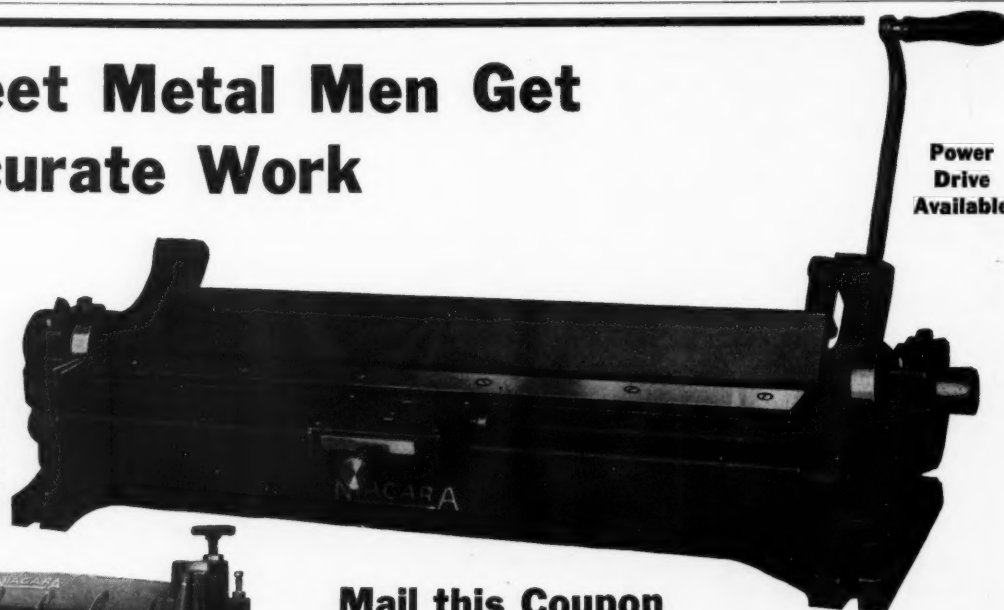
Similarly, the difference in total pressures between stations 4 and 5 gives the pressure loss through the furnace casing, and the difference in total pressures between stations 5 and 6 gives the pressure loss of the outlet-duct system.

In the succeeding article the test results from a typical plant will be presented. The proper measurement of air pressure in a ventilating duct system will reveal much information to the installer and manufacturer of heating and ventilating equipment.

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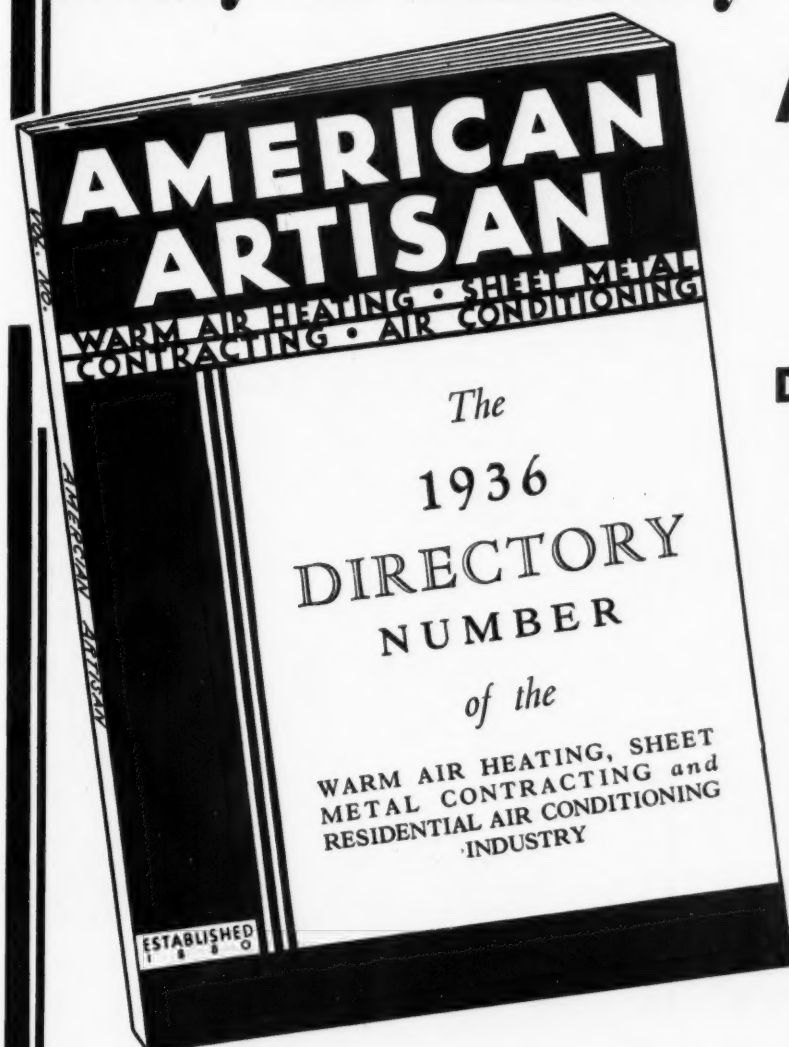
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## AMERICAN ARTISAN

### 1936

### DIRECTORY NUMBER

Listing close to 300 products, 1,000 trade names, 1,200 manufacturers' addresses . . . the most valuable buying service ever offered the industry . . . completely re-checked and brought up to date for 1936 use.

### Also Featuring This Year

Special section "prevuing" the 4th International Heating, Ventilating and Air Conditioning Exposition to be held in Chicago January 27-31 . . . the same week in which the National Warm Air Heating and Air Conditioning Association will be holding its winter meeting in Chicago.

AMERICAN ARTISAN'S Annual Directory Number now needs no introduction. It is the regular January issue each year and has become the indispensable reference guide for contractors, dealers, jobbers and manufacturers in the warm air heating, sheet metal contracting and residential air conditioning field. Complete and accurate, it answers the ever-present questions of "Who makes it?" and "Where are they located?" Between its two covers, the buyer can quickly, conveniently and confidently find all sources of supply for any product or device used in the field. It is the most popular, most helpful and the only thing of its kind published in the industry.

The added special feature . . . the "SHOW" Section . . . will give this outstanding issue extra interest and attention value. Many ARTISAN readers will be planning to come to Chicago to visit the International Heating, Ventilating and Air Conditioning Exposition. Many manufacturers in this field will exhibit there. The "SHOW" Section will report in advance what the readers will find awaiting them . . . what the manufacturers will exhibit.

Both the Directory and Show Sections will be in addition to the ARTISAN'S regular editorial content which by itself would be sufficient to start the New Year off right with an outstanding array of helpful, informative articles on important heating, air conditioning and sheet metal subjects.

*This number will be given over 7,000 mail distribution to the real buying power of the industry—contractors, dealers, wholesalers and manufacturers. Additional copies will be distributed at the exposition.*

## AMERICAN ARTISAN • 6 N. MICHIGAN • CHICAGO



## SHOP TALK



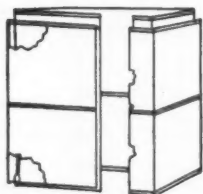
THE EXCELSIOR TIP-TOP

The Excelsior Tip-Top Steel Furnace presents several unique features in steel construction. The solid radiator provides uniform air flow on all sides resulting in uniform bonnet temperatures. The steel fronts are welded to feed and ash chutes making it absolutely gas and dust tight at these points.

Write today for prices and full details on this most unusual and efficient furnace.

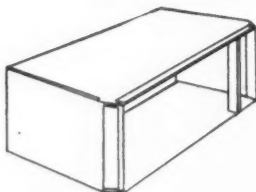
The Tip-Top means what it says—Tip-Top.

### REGULAR FURNACE PIPE



Excelsior Furnace Pipe and Fittings need no introduction to the trade. They have been on the market for more than fifty years and are recognized by everyone as the standard of comparison. Excelsior Double-wall Stack is more efficient than any other, due to its non-vented feature. Machinery of our own design and construction, coupled with an immense investment in tools and dies guarantee stacks and fittings that fit perfectly and require the minimum amount of labor and expense in installation.

### SQUARE FORCED AIR PIPE AND FITTINGS



The new line of rectangular ducts and fittings has many features that will appeal to progressive dealers. Standardized fittings enable branches to be taken from trunk lines in any desired direction either below or between joists. Dividing the trunk its full depth for every branch insures uniform distribution of air regardless of volume or velocity. This improved line is fully illustrated in our regular Furnace Pipe catalog. Be sure you have your copy.

**The EXCELSIOR STEEL FURNACE CO.**  
114-118 South Clinton St. Chicago, Ill.

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<input type="checkbox"/> Steel Furnaces	<input type="checkbox"/> Forced-Air Ducts	<input type="checkbox"/> Stove Pipe and Elbows

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## News Items . . . . .

### Contractor Expands Copper Facilities

Gatewood-Sengel Copper and Brass Works, 632-34 Baxter Ave., Louisville, Ky., has considerably increased its facilities for the exacting requirements of copperwork fabrication and installation for modern distilleries. Crutchfield Gatewood and R. J. Sengel are at the head. Among recent contracts reported by the firm was that of the Creel Brown Distillery Co. at Bardstown, Ky., the award calling for a complete copperwork installation. Tanks, coils, heaters, were installed by the Louisville firm. Yeast room equipment for the Jo Daviess County Distilling Co., Galena, Ill., was also supplied by this company.

### Date Set For National Warm Air Winter Convention

The next convention of the National Warm Air Heating and Air Conditioning Association will be held in Chicago during the week of January 27, 1936.

The winter meeting of the Association is usually held in December but the date has been advanced to afford a convenient opportunity for the delegates to visit the Fourth International Heating, Ventilating and Air Conditioning Exposition which is to be held in Chicago that week and also accept an invitation from the American Society of Heating and Ventilating Engineers to meet the same week and in the same city as their organization.

The convention session of the National Warm Air Heating and Air Conditioning Association will be held in the Hotel Stevens and that of the American Society of Heating and Ventilating Engineers in the Palmer House.

### Contractor Publicizes Roofing

The Memphis Fence and Roofing Co. factory and warehouse at 46 West Virginia, and city salesroom at 650 S. Main, Memphis, Tenn., has put on some very good publicity during the spring and summer season on the use of sheet metal for roofing. Julian Fulenwider, vice president and general manager, also gave several radio talks. The firm cooperates with kits and planning service and visitors receive a warm and cordial welcome. It has entertained this season many tanners and home builders at its places in Memphis.

### Establish Weather Laboratory

An all-weather laboratory has been constructed on the campus of Purdue University, Lafayette, Indiana, to further a program of research in air conditioning. It is planned to erect a number of homes, each featuring the latest development of reasonable cost construction and to use these homes as laboratories to study living conditions. Many notable individuals in the business world are members of the foundation contributing to the expenses of the project.

### Air Conditioning Shows Large Increase

Business Week, in a report issued recently, states that York Ice Machinery Corporation was recently awarded a contract for a million-dollar year-round air conditioning installation to be made in the Interior Department Building at Washington, D. C. Three companies—Carrier, Westinghouse and York—report that 1935 sales are running from 100 to 300 per cent ahead of 1934. Several large office buildings are announced for complete air conditioning.

### Gas Heat in the Chicago Area

The Peoples Gas Light & Coke Company and the Public Service Company of Northern Illinois announce that there are 35,045 gas heat users in the Chicago area. Eighty per cent of all gas heat installations in this area are in residential and apartment buildings.



## News Items . . . . .

### Abrams, Toledo, O., Heads New Roofing Firm

The Standard Sheet Metal & Roofing Co., located at 617 Southard Avenue, Toledo, O., has been opened by Irving (Abe) Abrams, for more than 15 years active with one of the leading sheet metal and roofing companies in Toledo.

Mr. Abrams says his new organization is ready to do a complete line of roofing and sheet metal work.

In the roofing field he will handle tin, slate, gravel, asphalt, built-up and asbestos roofing, and in sheet metal his organization will install metal ceilings, skylights, gutters, leaders, cornice work and tin-clad doors. In the heating field he will install air-conditioning furnaces, filters, humidifiers, controls and make all kinds of repairs to existing systems and furnish a vacuum cleaning service.

### Old Tinner Makes Headlines

C. Wessendorf, pioneer tinner and furnace dealer of Memphis, Tenn., was pictured along with two other native Germans as among Memphis' oldest living active business men, from the land of the Rhine. The others were in the coal trade and real estate. All had resided here some three score years and in business about that long.

### Stoker Sales Increase

The Committee of Ten of the Coal and Heating Industries, Chicago, announces that government figures show the sale of stokers in the first six months of 1935 were 73.3 per cent greater than the same period of 1934. This constitutes the biggest year in the history of the stoker industry. In the month of June, for example, the total sales of all sizes of stokers reported by 108 manufacturers were 2,812 units as compared with 1,985 units for the month of May. The figures show that the increase has been especially noticeable in small stokers for residential installation.

### Schilling, Marietta, Georgia, 50 Years Old

F. E. A. Schilling, Inc., the oldest retail establishment in Marietta, Georgia, celebrated its fiftieth anniversary on July 27 with an open house to which the public was cordially invited.

Schilling's was founded in 1885 by F. E. A. Schilling, Sr., father of the present owners of the store, and has been open every day since that time. The management of the store today is in the hands of Fred Schilling, Jr., and H. O. Schilling.

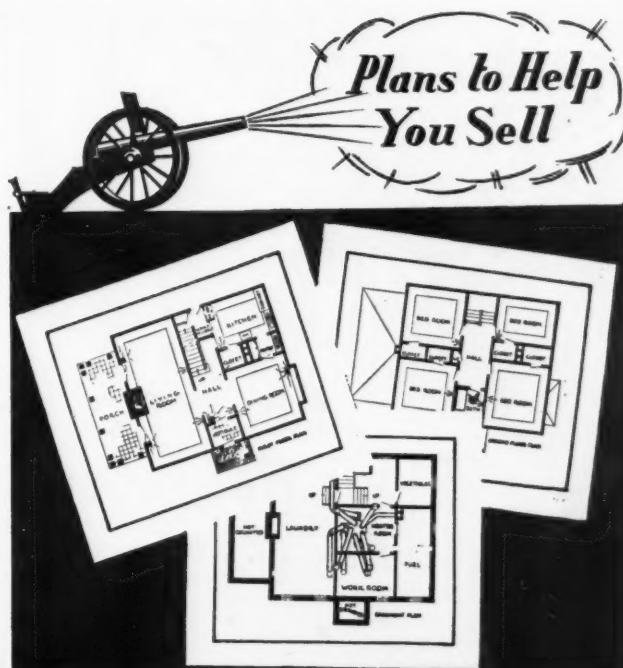
The anniversary celebration was widely heralded as a "golden jubilee" affair and hundreds of messages of congratulation were sent to the firm both from local merchants and firms of national standing.

### Model Home Air Conditioned

L. H. Rost, 633 E. High St., Jefferson City, Mo., furnished the Lennox Aire-Flo air conditioning furnace and gas furnace features of the Geo. A. Linhardt Model Home opened on Boonville road late in August. The home is of English architecture, brick exterior, walnut stained woodwork in most of rooms, knotty pine in recreation room, has six rooms exclusive of reception hall, master bed room second floor and recreation room basement. It cost \$6,000. It was open to the public for several days in late August and September.

### Old Time Coppersmith Dies

John Schmits, 71, veteran coppersmith and sheet metal man, resident of Chattanooga, Tenn., for fifty years, died suddenly Aug. 6 at the home of his sister, Mrs. Addie Wulff, 421 Cypress St. He is survived by his wife, two children, three sisters and five grandchildren, all residents of Chattanooga.



## THE MARSHALL Engineering Department ... Backs You Up

When you become a Marshall Caloric Dealer our engineering department becomes a part of your own business, ready and willing to assist you in every possible way. You have available for use in your business the results of our fifty-three years experience in the planning and installing hundreds of thousands of heating systems.

When an unusual problem comes up—you just write us and our engineers go to work for you. We send back to you plans and suggestions which help you to close the business.

Here is further proof that we are not satisfied just to sell you castings—but that we want to do everything in our power to help you make a success of your business. You will like the friendly, sincere, helpful way in which we will cooperate with you.

Mail the coupon and let us tell you the whole story.

### MARSHALL FURNACE COMPANY MARSHALL, MICHIGAN

Heating and Air Conditioning Equipment  
54 Years Continuous Service

Marshall Furnace Company, Marshall, Michigan

Please send me complete information about your Dealer-Help plan and a copy of your latest catalog.

Name.....

Address.....

City..... State.....

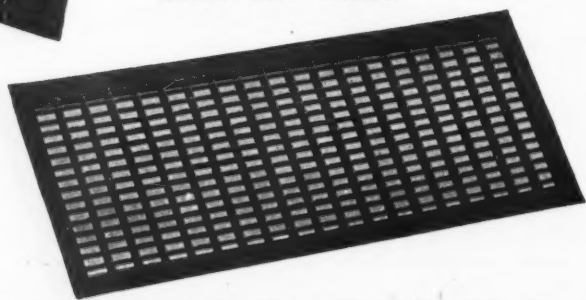
A.A.5



If you lean toward the "grid" type floor register and are not familiar with the new H & C No. 210, by all means ask your H & C jobber to show it to you at once! You will find that it matches perfectly our No. 265 Cold Air Face which has already become exceedingly popular with the trade, and that together they offer the opportunity for exceptionally neat and attractive floor installations. Both are superbly well built. The mesh is narrow to avoid catching heels—Intersections are flush, for better appearance—Margins are straight as a die, narrow for close installation and bevelled for strength—Corner joints are invisible—Members are carefully aligned—Both register and face possess unusually large air capacity.

It pays to handle the best! Why not see your H & C jobber immediately?

**H & C No. 265 "No-Flex"**  
**Cold Air Face**



**HART & COOLEY MANUFACTURING CO.**  
Warm Air Registers   **H & C**   Air Conditioning Grilles  
Regulator Sets   Dampers • Chain  
61 W. KINZIE ST. • CHICAGO • ILLINOIS

## News Items . . . . .

### Model House in Memphis

The American Legion \$15,000 magic house at Peabody and Kimbrough Streets, Memphis, Tenn., was attracting the plaudits of visitors in August. It is a story and a half structure, with fluted pilasters and Georgian entrance, mantels replica of a Connecticut house of the Revolutionary days. It has rathskeller in basement. Mueller heating and air conditioning equipment for the house was furnished by the Bluff City Sheet Metal Works, 676 Madison Ave., A. H. Hanson, owner. The same firm installed the gutters.

### Federal Housing Progress

That both the modernization of homes and business properties and the building of new residences have increased since the Modernization Credit Plan and the Mutual Mortgage Insurance Plan got under way is borne out by a graphic chart published by the Federal Housing Administration.

Based on the building permits for over 700 identical cities of the United States reported to the Bureau of Labor Statistics, Department of Labor, this chart shows that since January 1, 1935, there has been a large and steady increase in the number and value of new residential buildings.

An analysis of the chart shows that starting in September, 1934, the number of modernization permits (additions, alterations and repairs) increased each month over the previous month until January, 1935, and the value increased up to the month of December.

Coincident with the effective beginning of the Mutual Mortgage Insurance Plan, just previous to January 1, 1935, was the sharp rise in the number and value of permits issued for new residences. Even in the off-season months of January and February, the gains over the previous year were respectively 66.6 per cent and 102.3 per cent in number of permits—in value the increase was 104.8 per cent and 99.4 per cent. In March they continued to rise. During April and May the increase in both number and value were not quite as high as in March. In June, however, a new high point was reached—the number increased 157.3 per cent and the value increased 228.9 per cent. In July, when there is a usual falling off, the number of new residence permits increased 183.4 per cent but the value increase 214.9 per cent was slightly lower than June.

### Ford to Use Conditioning in Foundry

For the first time in the history of automobile manufacturing, temperature regulation and air conditioning are being installed in machine shops and foundries. This is being done at the Ford Motor Company's Rouge factory, largest industrial plant in the world. The installation already includes 200,000 cubic feet of buildings, and soon will include a further 75,000 cubic feet.

The purpose is three-fold, according to Ford officials . . . to control the accuracy of fine machining operations, such as cylinder lapping; to increase the comfort of the workmen; and to protect the processes from dust and dirt.

For several years the company has controlled the temperature in its gage rooms, so the accuracy of gages—some of which register in millionths of an inch—shall be insured. Within recent months temperature regulation has been extended to inspection rooms in various parts of the plant. A few weeks ago the cylinder lapping room was air conditioned. Installation of air conditioning in various mould rooms of the foundry is now in progress.

The air-washing apparatus which had previously been used to supply outside air to the foundry collects about 42 cubic yards of dirt a week, about 42 tons. While it will be impossible to control the temperature exactly in the casting room because of the great heat radiated from the ladles of molten steel while casting is in progress, it will be possible to reduce the temperature and humidity greatly and so increase the comfort of the men.



# ROUND OAK OFFERS THE MOST PROFITABLE DEALER SETUP IN THE FIELD TODAY!

- A COMPLETE LINE
- MODERATE PRICES
- RAPID DELIVERY SERVICE
- ENGINEERING HELPS
- ADVERTISING HELPS
- FINANCE PLAN



CAST  
IRON

ROUND OAK backs up its dealers to the limit . . . with high quality, moderate prices, quick deliveries, plus every cooperation and support to help you do business and make money.

As the ROUND OAK dealer in your community you have a COMPLETE line of steel and cast iron furnaces, for both solid and liquid fuel. You can sell at moderate prices . . . and get quick deliveries. Valuable advertising material is yours. Skilled heating engineers plan individual installations for you. And . . . the ROUND OAK Finance Plan enables you to sell on time without tying up your capital.

Write us today. Get set now with the ROUND OAK line and cash in during the big fall season just starting.



STEEL

THE "BLENDED-IRON"

Patented diamond shaped radiator, specially designed water pan, patented rod construction, and many other features which make it the standard of comparison among cast iron furnaces.

## ROUND OAK COMPANY

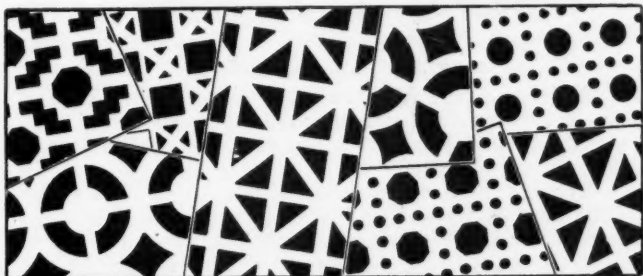
STOVES . RANGES . FURNACES . AIR CONDITIONERS  
DOWAGIAC SINCE 1871 MICHIGAN

THE "MOISTAIR BOILER-PLATE"

Seamless electric arcwelded unit construction, permanently tight and leak-proof. Every feature essential in a modern, economical, dependable, and quick acting heating system.



## A WIDE VARIETY TO SELECT FROM



The variety of patterns obtainable in Wickwire Spencer Decorative Perforated Metals is unusual and most helpful to the manufacturer of products using them. An ample stock is always on hand to insure prompt service. Send for your copy of the new folder "Decorative Perforated Metals." See some of the newest.



**WICKWIRE SPENCER STEEL CO.**

41 EAST 42nd ST., NEW YORK CITY

WORCESTER BUFFALO CHICAGO SAN FRANCISCO

SEND FOR THIS NEW FOLDER

## WICKWIRE SPENCER perforated metals

# VICTOR FORCE AIR FANS

**Powerful—Rugged—Dependable  
Better Performance—Lower Cost**

Here's a line of exhaust fans that give you greater value for your money than you can find anywhere else. They are built right and priced right—and they are guaranteed to give perfect satisfaction. Equipped with Victor's own super-powered motors, they will out-perform any ordinary fan. Sizes range from 6" to 16". Be sure to write for literature and prices today!

## The Victor Heat Booster Brings the Heat Up Fast—Improves Heating Efficiency Greatly

Now, you can make any hot air system perform better. Pulls "cold air cork" out of pipes in a hurry—increases heat circulation—cuts fuel bills. Solves early morning heating problem—greater comfort for every furnace owner.

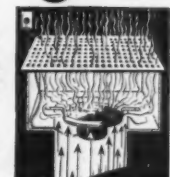
### Easy to Install

Floor type booster fits neatly under register—connects to nearest electric socket. No trouble—just a few minutes to install. Wall type booster mounted on beautiful maroon finished panel which hangs on grille. A great profit item for any furnace repairman—write for complete details now!

**VICTOR ELECTRIC PRODUCTS, INC.**  
720 Reading Road Cincinnati, Ohio



Only  
**\$5.95** List





# Cash In

WITH

## ARMCO

### STAINLESS



**H**OTELS, restaurants, stores, hospitals—profitable opportunities to use Armco Stainless Steels abound everywhere in your working territory. • Here are bright modern metals that never tarnish, rust or peel; that are sanitary and easy to keep clean; that resist heat; that can be bent, formed, soldered and welded easily enough. • And remember, there is *sales power* in the name Armco, the same acceptance by buyers that you've always enjoyed with INGOT IRON and other Armco Products. Cash in with Armco Stainless Steels. We'll be glad to help.



Write for the name of the nearest Armco Stainless Distributor. The American Rolling Mill Company, Executive Offices, Middletown, O.

**ARMCO**  
**STAINLESS STEELS**  
• • • HELP YOU MAKE MONEY

## New Literature . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 68.

### 294—Gravity Warm Air Heating

The National Warm Air Heating and Air Conditioning Association announces that the book, "Gravity Warm Air Heating," which the association is publishing, is now ready for mailing and will be sent to any contractor upon receipt of \$2.00 for a single copy or \$1.50 in lots of twelve or more.

As announced by the association at the spring meeting, the book was edited by Professor J. D. Hoffman of Purdue University and gathers together in its 511 pages all of the information pertaining to gravity warm air heating disclosed by years of tests at the Research Residence in Urbana.

There are twelve main chapters covering such important subjects as: heat transmission; factors affecting furnace capacity and efficiency; relative performance of leaders, stacks and fittings; registers; recirculating system; fuels and combustion, etc. Many relating subjects, such as: effect of wind and sunshine on fuel consumption; heating effect of elbows in leaders; best types of casings and bonnets, etc., are included in the various chapters covering the subjects to which these problems refer. Contractors wishing books may place orders through AMERICAN ARTISAN or correspond direct with the National Warm Air Heating and Air Conditioning Association, 50 West Broad Street, Columbus, Ohio.

### 295—Duo-Metals Catalog

A presentation of the metallurgy, method of manufacture, reaction to fabricating processes of Duo-metals in which a hard, bright exterior is permanently welded to a soft metal backing, is presented in a new catalog issued by Latrobe Electric Steel Company, 40 West 40th Street, New York City. Many illustrations show the composition of various types of clad metals. The text explains how clad metals are manufactured, also how these metals react to fabricating processes.

### 296—Copper Alloy Steel

A small folder devoted to Inland Copper-Alloy Steel has just been published by the Inland Steel Company, Chicago. It incorporates proof of copper-bearing steel's ability to combat corrosion, cites some interesting applications where loss from corrosion has been cut, and points out a sales appeal valuable for all manufacturers of metal products.

### 297—Humidistat Leaflets

Bulletins A and AT/R, of the Julien P. Friez & Sons, Inc., Baltimore, Maryland, cover the company's line of wall-mounting humidistats, relays and complete control assemblies.

The first leaflet, covering humidistats, shows illustrations of the several types of units manufactured and gives complete information on the proper selection, installation and operation of the units. List prices of all units are included in the catalog.

In the second leaflet relays, relay-transformers, singly and in sets, are described and shown accompanied by full instructions and list prices.

### 298—Stove Repair Catalog

Northwestern Stove Repair Company, 662 West Roosevelt Road, Chicago, Illinois, announces a confidential trade price list, dated August 1, 1935. The catalog is not a complete listing of all of the items carried in stock by the Northwestern Company, but is designed to list all of the piece prices on those parts made from the company's own patterns which are in most popular demand. Prices on parts not listed will be furnished on application. The catalog covers more than 120 furnaces. Parts carried in stock for each of the furnaces listed together with prices of the parts are presented in tabular form for quick reference.

## ANOTHER RYBOLT FURNACE

# PROVEN!

This New Rybolt Furnace is a stand-out—the most advanced on today's market. No sharp

curves to hamper the flow of warm air to its proper destination . . . one-piece radiator with smoke and clean-out collars cast on . . . dust-proof . . . it is practically a streamlined heating system.

Every Rybolt furnace installation gives efficient, economical and trouble-free service for years. You, as a dealer, can appreciate that this proven fact will develop many staunch customers for you . . . as a successful furnace installation will make a happy customer and a happy customer will send you additional business. Rybolt has proven its success in the field. Investigate . . . and get in line with the Rybolt line.



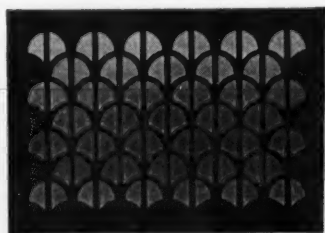
**THE RYBOLT HEATER COMPANY**  
Ashland Ohio

## PERFORATED METALS

### ARCHITECTURAL GRILLES

In Bronze, Steel, Stainless Steel, Monel, Aluminum, and other metals. Grilles of distinction for fine buildings in a wide variety of attractive designs. All of the standard and many original and modern designs are available in any metal, and of all dimensions, carefully made from selected stock. Grilles are but one of our specialties. We make Perforated Sheets of every type.

Pleasing  
Prices,  
Prompt  
Service



50 Years  
Experience  
Perforating  
Metals

**The Harrington & King**  
PERFORATING CO.

5649 Fillmore St., Chicago, Ill.

New York Office, 114 Liberty St.

## Why

### STRUGGLE ALONG

with old, cumbersome tools trying to meet the competition of the shop with up-to-the-minute equipment? Look into the possibilities of Stanley Unishears. It will pay you.

- Stanley Unishear is light in weight and can be carried to the job.
- It will cut up to 15 feet per minute.
- Any shape—curves, angles or straight lines—can be cut to hairline accuracy with a Stanley Unishear. Models are available with capacities up to 1/4" boiler plate.

Send for descriptive material



**STANLEY ELECTRIC TOOL DIVISION**  
THE STANLEY WORKS

131 Elm St., New Britain, Conn.

For Fast Cutting • **STANLEY UNISHEAR**

## New Literature . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 68.

### 299—Jobbers' Catalog

The Waverly Heating Supply Company, 32 Union Street, Boston, Massachusetts, announce their 1935 catalog and manual of warm air heating. The company states that they will be glad to mail copies of the catalog to contractors in the New England area.

The first part of the book covers the general principles of gravity and forced warm air heating, presenting information on air supply, humidity, heat loss, methods of figuring gravity installations, compilation of tables and charts which can be used daily, a section on forced air heating and air conditioning covering quick methods of estimating, duct losses, heating of garages, bathrooms and sunrooms, the design of duct systems, summer cooling and all such apparatus as fans, filters, washers, furnaces, etc.

The catalog section of the book covers hundreds of items used in warm air heating carried in stock by the company. Such items as furnaces, pipe, paper, sheets, blowers, tools and apparatus, dampers, oil burners, registers, ventilators, water heaters and others too numerous to mention are shown and described in detail. Accompanying tables list the items and give the prices per item. Whole sections from manufacturers' catalogs have been combined with the book to show the complete line of equipment carried in stock by the company.

### 300—Winter Air Conditioning Catalog

The Edwards Manufacturing Company Cincinnati, Ohio, announce a new small catalog covering the Edwards Hot-

Kold winter air conditioning system. Text material gives the reasons for winter air conditioning, discusses the various factors of conditioning, such as heating, cleaning, circulation, control, etc. The two inside pages present illustrations, tables of dimensions and capacities and full description of the Edwards furnace. The last page discusses the problem of good engineering in winter air conditioning systems.

### 301—Furnace Blower Catalog

The Emerson Electric Manufacturing Company, St. Louis, Missouri, announces furnace blower catalog No. X-573 giving full information on Emerson furnace fans, blowers, bonnet controls, etc. The company also announces sheet No. X-826 covering the new No. 14 Emerson furnace blower.

The catalog shows the propellor fan which can be mounted in the cold air shoe and contains tables of dimensions and specifications. The multi-speed Emerson blower of the two-wheel type, offering several selective speeds of operation, is also presented together with typical installation pictures. The combination Emerson blower and washer-filter unit is also covered by photographs, specifications and tables of operating characteristics.

### 302—Ventilator Leaflet

F. Meyer & Bro. Company, Peoria, Illinois, announce a four-page leaflet describing the company's "Syphon Air" ventilator. The new ventilator, which is of the gravity type, is described in detail with information on why the operating characteristics differ from other types of gravity ventilators. A table of specifications; giving sizes, capacities, gages of iron and prices in the range from 8-inch to 48-inch ventilators is included. The leaflet also gives sizes, gages and prices of the company's "Handy" and "Crescent" ventilators.

## FAULTLESS HEATER CORPORATION

SUCCESSOR TO THE GRAFF FURNACE CO.

CLEVELAND, OHIO

manufacturer of

## FAULTLESS FURNACES

ALSO

## FURNACE REPAIR PARTS

from the original Graff patterns for

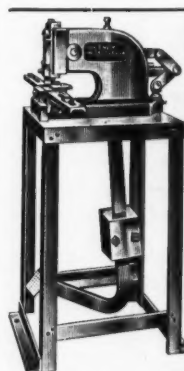
FAULTLESS COMFORT  
FAULTLESS-COMFORT CAPITAL  
LACKAWANNA PHILADELPHIA  
RIVAL and other Graff Furnaces

The following Supply Houses carry a stock of these Repair Parts made from our original patterns:

DETROIT, MICH.  
Detroit Stove & Fce. Repair Co.  
Star Steel Supply Co.  
ELMIRA, N. Y.  
C. A. Miller & Co.  
BRIDGEPORT, CONN.  
Lippick Stove Repair Co.  
SPRINGFIELD, MASS.  
The Burden-Bryant Co.  
PHILADELPHIA, PA.  
Aetna Stove Co., Inc.  
Central Stove Repair & Fdy. Co.  
Standard Stove Repair Co.  
United Stove Repair Co.  
Weinstein Supply Co.  
M. Stein  
WASHINGTON, D. C.  
Fries, Seal & Sharp Co.  
NEWARK, N. J.  
Esolgroth & Co.  
ALLENTOWN, PA.  
Pennsylvania Supply & Mfg. Co.  
SCRANTON, PA.  
Samuel Weinberg & Sons, Inc.  
BOSTON, MASS.  
Huse & Carleton, Inc.  
Henry N. Clark Co.  
Waverly Htg. Supply Co.  
MILWAUKEE, WIS.  
The Spelch Company

CHICAGO, ILL.  
Associated Heater Parts Co.  
M. Brucker  
YOUNGSTOWN, OHIO  
Banner Repair Parts Co.  
ROCHESTER, N. Y.  
Henry Siebert Sons, Inc.  
PITTSBURGH, PA.  
The Graff Company  
A. H. Johnson Co.  
Shambien Furnace Parts Co.  
WILKES-BARRE, PA.  
White Hardware Co.  
Wilkes-Barre Hdw. & Stove Co.  
BALTIMORE, MD.  
George J. Thaler, Inc.  
BUFFALO, N. Y.  
O. G. & D. H. Donaldson Co.  
Minet Heating & Supply Co.  
NEW HAVEN, CONN.  
New Haven Stove Repair Co.  
SHAMOKIN, PA.  
Geo. B. Kolser  
NEW BRUNSWICK, N. J.  
New Brunswick Stove Co.  
WILLIAMSPORT, PA.  
Neyhart's, Inc.  
MINNEAPOLIS, MINN.  
Dunham-Scott Company

These Supply Houses can give you prompt service.

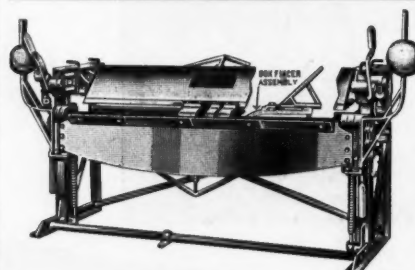


## WHITNEY TOOLS



Foot Presses. Like all Whitney tools, this foot press is built to give a lifetime of good service. Expertly designed and made of the best materials throughout.

The Whitney No. 4 One-Piece Hollow Punch. Drop forged and containing a self-centering spring point. Can be furnished in sizes from 7/8" to 1 1/8" by 1/8" variation.



Whitney-Jensen Combination Bending and Box Brake. Has 17 distinctive points of superiority. Write today for special descriptive leaflet fully illustrated.

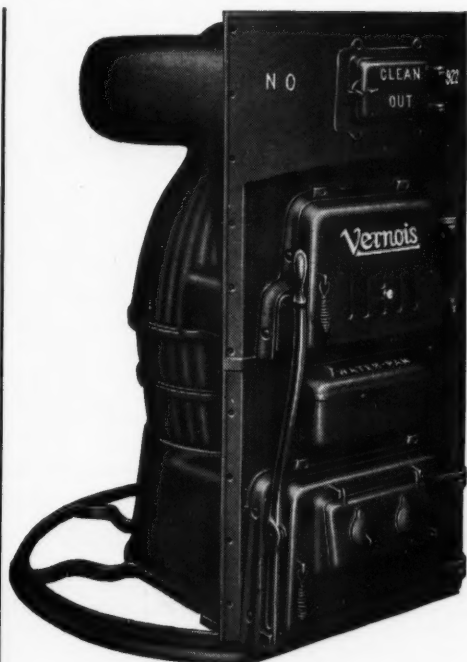
The Whitney Metal Tool Company manufactures a complete and strictly quality line of tools. Of many hundreds of items which we

carry in stock, only a few can be shown in these advertisements. Always write us when you have a tool problem.

## Whitney Metal Tool Co.

91 Forbes Street, Rockford, Illinois





Write at once for the "convincing proof" literature and get complete details on our dealer proposition and the MT. VERNON easy payment plan . . . 3 years to pay at low FHA rates.

## IT'S BEEN PROVEN THAT VERNALLOY PROCESSED IRON

will last  $1\frac{1}{2}$  times as long as ordinary cast iron. This proof is a matter of actual test . . . more severe than any furnace will ever have to face . . . and it means to your customer that the VERNONIS you sell him will give him better service, greater dependability, more lasting efficiency and freedom from repair expense than any furnace of ordinary cast iron.

VERNALLOY is an exclusive metal-treating process used ONLY in the making of MT. VERNON PRODUCTS . . . a process which makes iron much more resistant to heat and keeps it from "growing," deteriorating and losing its strength under alternating high and low temperatures.

It gives MT. VERNON dealers a potent sales argument which no other furnace can offer or refute . . . an advantage over competition which means volume and profits. Go into the business battle equipped with this powerful sales weapon.

**MT. VERNON FURNACE & MANUFACTURING COMPANY**  
Mt. Vernon Illinois

**YOUR  
big  
market  
TODAY**



**A**RE you taking fullest advantage of the repairing, remodeling and replacement market which exists in your locality today? It's a real live market and represents profitable business to the sheet metal contractor who goes after it. Your Viking

Shear will prove your greatest asset in the handling of this work. Because it cuts quickly and accurately your Viking Shear will help you cut your time costs down to the minimum.

Viking Shear Co., Erie, Pa.

**THE VIKING SHEAR**

## NORTHWESTERN STOVE REPAIR CO.

Manufacturers of  
**FURNACE, BOILER and STOVE REPAIRS**

Distributors of  
**FURNACES, CEMENT, PIPE and  
FITTINGS, HEATING ACCESSORIES**

**LARGEST STOCK  
OF REPAIR PARTS  
IN THE WORLD**

**SEND FOR OUR NEW REPAIR  
PRICE LIST**

**662 W. ROOSEVELT RD.  
CHICAGO, ILL.**

## With the Manufacturers . . . .

### Announce Viking Air Conditioning Corporation

Announcement is made of a new organization to be known as the Viking Air Conditioning Corporation, 1935 Euclid Avenue, Cleveland, Ohio. This concern will specialize in the manufacture of winter air conditioning units for the converting of existing furnaces into satisfactory mechanical heating jobs. A number of improvements in air circulators, such as: the inclusion of sound insulation, adjustable speed drives, a method for changing filters for summer and winter use, etc., are proposed for the new apparatus.

### Distributes New Metal Roofing

The Pidgeon-Thomas Iron Co., Iowa St. and S. Main, Memphis, Tenn., has been appointed tri-states distributor for the Globe Dri-Lap 5 V Crimp roofing, Phil Pidgeon, president, reports. The roofing may be obtained in galvanized or painted coating.

### Inland Steel Acquires Ryerson Firm

Plan has been announced whereby Inland Steel Company of Chicago, through its board of directors, has approved plans for the union of the Inland Steel Company and the Joseph T. Ryerson & Sons, Inc., also of Chicago. The plan contemplates the operation of the Ryerson Company under its present name and management as a wholly owned subsidiary of the Inland Company. Edward L. Ryerson, Jr., present head of the Ryerson Company, is to be active with the Inland Company as one of its executive officers.

### Furblo Appoints Cleveland Representative

The Furblo Company, Hermansville, Mich., announces the appointment of R. W. Walker, Inc., 8018 Wade Park

Ave., Cleveland, Telephone Henderson 3224, as their direct factory representative in the Cleveland area, succeeding Walter J. Ottinger, former representative.

### Republic Steel Opens Kansas City Office

Opening of a new sales office at 622 Dwight Bldg., Kansas City, Mo., effective September 1, is announced by N. J. Clarke, vice president in charge of sales, Republic Steel Corp., Youngstown, Ohio. The new office will be in charge of Robert L. Pierce, of the St. Louis district sales office.

### Revere Opens Office in New Bedford, Mass.

On September 1, the offices of the Taunton-New Bedford Division of Revere Copper and Brass Incorporated were removed from Taunton, Mass., to New Bedford, Mass., where Revere's principal New England mill is located. Mill operations will be continued, however, in Taunton and a warehouse will also be maintained there.

#### FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.,  
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Check numbers in which you are interested):

188	189	190	191	192	193
194	195	196	197		
198	199				
294	295	296	297	298	
299	300	301	302		

Name ..... Title .....

Company .....

Address .....

## HESS FURNACE AIR CONDITIONER BLOWER FILTER UNIT

### ATTENTION DEALERS

During August alone, over 300 dealers have written us to learn the details and merits of the Hess line. It will pay you also to investigate.

### HESS EQUIPMENT

Distinctively superior, different than ordinary equipment. Gives you the best chance for profits.

### HESS FINANCE PLAN

Low F. H. A. rates, 5% per year. Up to 36 months to pay. Dealer paid in full without recourse or hold back.

**WRITE FOR DEALER PORTFOLIO**  
HESS WARMING & VENTILATING CO.  
1211-27 S. WESTERN AVE., Founded 1873  
CHICAGO, ILLINOIS

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Everything, anything, and made of the finest materials—are all  
**CENTRAL REPAIR PARTS.**

TO FIT ALL MAKES OF . .

- STOVES
- FURNACES
- BOILERS
- OIL STOVES

**CENTRAL FURNACE & STOVE REPAIR  
COMPANY**

3937 Olive Street.

St. Louis, Missouri

HEATING

# SUGGEST THE USE OF COPPER ON JOBS WHERE COPPER WOULD BE BETTER

## ● H U S S E Y

Copper is the quality material on any job.

The value is in the metal—what it will do—how it will last.

Suggest the use of copper as you figure a job where copper would be better. In any quality job, the buyer remembers the satisfaction and the service he gets long after he forgets the price he paid.

And naturally there is more profit for the contractor in a copper job. That is important in these days when there are not too many jobs to go around. Your best chance for constructive salesmanship is in selling each job as a quality job.

When you need copper, get in touch with Hussey. There is a warehouse or a sales office near you, with a full stock ready for your shipping orders.

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BUFFALO  
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CINCINNATI  
CLEVELAND  
ST. LOUIS  
NEW YORK  
PHILADELPHIA  
PITTSBURGH  
**WAREHOUSES**  
CHICAGO  
CINCINNATI  
NEW YORK  
CLEVELAND  
ST. LOUIS  
PHILADELPHIA  
PITTSBURGH  
**MILLS AND EXECUTIVE OFFICE**  
PITTSBURGH

**C. G. HUSSEY & COMPANY**  
**PITTSBURGH, PENNSYLVANIA**

### WHITNEY No. 4-B PUNCH

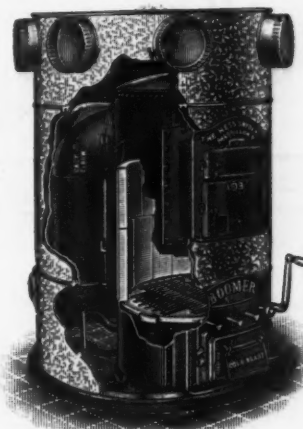


This punch for sheet metal work has a capacity of 1/4-in. through 16 gauge. Weight 3 lb. Length 8 1/2-in. Depth of throat 2-in. Complete tool includes three punches and three dies of specified sizes with die adjusting key.

#### THE WHITNEY LINE

In the W. A. Whitney line of Hand Lever Punches you will find a portable hand lever tool suitable for every requirement. They are made in ten sizes and types, ranging in size from the Tinnars No. 4 Punch, which punches 1/4-in. hole through 16 gauge iron to the No. 92 Punch, capable of punching a 2-inch hole through 1/4-in. stock. Each tool has its special field of work as recorded in our latest catalog.

**WRITE FOR CATALOG G**



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*Also made with duplex grates and upright shaker.*

Have been successfully made for 22 years. Where introduced have given satisfactory service. The fire pot liners are the best we can buy and we know of several Boomers that still have the original liners in, which are 22 years old. We have been making cast iron Boomers for 50 years.

If you are interested in selling a strictly high grade furnace, ask for prices and agency.

Nothing but the best of material enters into the making of Boomers.

When repairs are needed, avoid risk of dissatisfaction by ordering direct from the original patterns. Prices are low.

*We sell to legitimate dealers only.*

**THE HESS-SNYDER CO., MFRS.**  
Massillon, Ohio



## Remedies For Range Hood Problem

(Continued from page 22)

much as possible, particularly during the winter when the front door is kept closed. The dropping of the curtain down as low as possible on the front of the hood will also have the same kind of beneficial effect as the ends, by confining the smoke until the fan has an opportunity to pull it out.

### Pipe Tightness

For anything like good results, the pipe must be connected up tight with the fan. It is true that there is some advantage in leaving the pipe unconnected to the fan, with a little space between the open end of the pipe and the fan, in that the fan thus will draw out any smoke that the hood has lost. In other words, when smoke comes out of the hood, it will drift up toward the ceiling, and if the fan is not connected up tight to the pipe, the smoke lost by the hood will be taken out by the fan. However, leaving the fan unconnected to the pipe cuts down the

efficiency of the fan; and where the fan is none too efficient anyhow, and has no more than enough capacity to take care of the hood only, it is not a practical thing to have the fan unconnected to the pipe.

The whole thing can be accomplished, and better, by connecting up the pipe tight to the fan and arranging for a tight door in the pipe which can be kept closed, or opened to any desired degree; so that when the necessity arises, the open door to the fan will take care of the smoke which has been lost by the hood. In summer, this door left open, will function well in heat removal. Such an arrangement gives the operator control over the system.

### Changing Fan

Moving the fan to the window directly over the center of the hood, thereby shortening the duct and eliminating one turn, will add something to the efficiency of the system as a whole, but perhaps

not more than 8 or 10 per cent.

There is nothing to be done about the efficiency of the fan. The owner has the fan, and is not going to throw it away if there is any chance to get by with it. But it would be easy to double the capacity of the system on the basis of air delivery, by the use of a higher speed fan with a properly designed blade, and with a rather less current consumption.

This kind of a job presents a certain hazard to the sheet metal contractor, because if he goes in and does one of the necessary things, it probably will not be sufficient to bring the system up to a satisfactory point. He will therefore have an unsatisfactory job with the consequent difficulties of collecting, and the possibilities of comebacks and injury to his reputation. If, however, he can go in and do the several necessary things to bring the job up to a reasonable standard, at the same time without making any promises that he cannot fulfill, he has established himself with the customer, and added one more satisfactory job to his list.

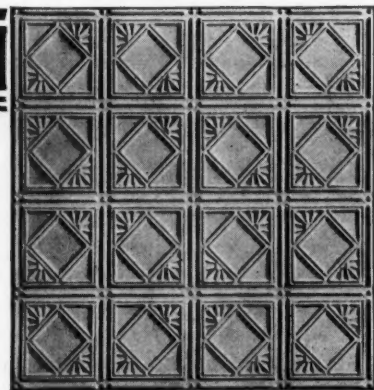
## SEND FOR NEW CATALOGUE!

IT'S a fitting book for CAPITOL  
... it contains everything for  
efficient furnace repairs ...  
it proves our slogan ...

## CAPITOL HAS IT!

**CAPITOL FURNACE & STOVE REPAIR CO.**  
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## LOOK UP TO GREATER PROFITS!



The demand for steel ceilings is increasing daily ... because they possess so many distinct advantages. Beauty is one of the many and CANTON offers for your inspection a modern and beautiful line of steel ceilings.

There is a profit in the installation of steel ceilings. If you are CANTON-equipped you will be able to offer your prospects the quality; and the variety to choose from will convert them into customers.



CANTON will make profit for you. Write at once for Catalogue F and complete information on CANTON Sales Helps.

Sold through leading sheet metal jobbers.

**CANTON STEEL CEILING CO.**  
CANTON OHIO

Warehouse Service: 497 West St., New York City  
and Canton, Ohio

## STER-NA-MAN

### KNOCK DOWN Smoke Pipe Fittings

#### A WAREHOUSE UNDER YOUR ARM

You cannot afford to be without them . . . they save time, labor and space . . . they are your answer to larger turnover and profits . . . look over these 13 really outstanding features and convince yourself of Ster-Na-Man's superiority.

- 1 A "KNOCK-DOWN" fitting—parts interchangeable—no rights or lefts—order just the parts you need to keep your stock complete.
- 2 Reduces necessary investment in fittings 75%.
- 3 Cuts fitting stock 4 to 1—a small carton, 11½x12x18½ will contain the equivalent of a dozen of any type standard furnace smoke pipe fittings.
- 4 Affords a 400% greater turnover on stock.
- 5 Complete fitting stock can be stored in fraction of present space.
- 6 Makes the "measuring-up" trip unnecessary.
- 7 Saves crating, sorting and shipping costs.
- 8 Merchandise always clean and ready for use.
- 9 Saves labor on the job—no loss of time when fittings are not at hand.
- 10 Gives customer a strong, tight job, without unsightly wires; a job mechanically right.
- 11 Priced in line with ordinary fittings.
- 12 Affords a reasonable profit without fear of cheap competition.
- 13 Standard line of Ster-Na-Man fittings are made from full 24 gauge tight galvanized sheets.

WRITE FOR PRICES AT ONCE—JOBBER WANTED

**A.G. BRAUER SUPPLY CO.**

Jobbers and  
Wholesalers of



For Furnace, Boiler  
Stove, Oil Stoves

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matter how small, how large, how old or how new, repair parts for any heating appliance can be secured from Brauer, a most efficient and reliable source of supply . . . with the RIGHT PRICE.

**A.G. BRAUER  
SUPPLY COMPANY**

316 NO. THIRD ST. + SAINT LOUIS  
IN STOCK • READY FOR IMMEDIATE SHIPMENT



## CHRISTIE FURNACE VACUUM CLEANER

A One-Man  
Super Powered  
Machine

**\$99<sup>50</sup>**

Subject to  
Change Without  
Notice

F. O. B. Cincinnati  
with Tools and Attachments.

This is the same high quality machine that is known to furnace dealers everywhere as the most powerful, one-man cleaner on the market. Built by practical furnace men.

Quantity production and large purchasing power enable us to make this sensationally low price. Includes tools and attachments. Folder "A" mailed upon request.

We also manufacture the "Christie Giant" to operate from truck or yard.

Sold by Jobbers and Furnace Manufacturers. Write for names of those in your territory.

**CHRISTIE CLEANER COMPANY**

Division of The Cincinnati Sheet Metal & Roofing Co.  
226-30 East Front St. Cincinnati, Ohio

Salesmen: A few choice territories still open.

## A Complete Line of Furnaces Means . . . .

### • BIGGER PROFITS

Here is a complete line of cast iron or steel furnaces, either gravity or forced air types that give you a complete range of styles, and priced so that you can meet all competition. When you handle the Liberty Line you can quote on all installations regardless of size or type of firing, giving you larger volume of sales which means Bigger Profits.



The FRONT RANK gravity type warm air furnace is the result of 45 years of knowing how to build furnaces with high efficiency and economy. Heavily constructed of high quality steel, rigidly riveted and welded with tubular type radiator.

The FRONT RANK Crescent is also of steel construction but is equipped with crescent type radiator to give higher heat radiation. The new FRONT RANK DeLuxe is the last word in forced type warm air conditioners. Entirely automatic with balanced humidifying and temperature controls it meets the demand for the most modern dwellings. It can be equipped with oil or gas burner, automatic stoker or can be hand fired.

The Mellow warm air furnaces are America's Perfect Heating units. They are made of solid cast construction and are designed for high efficiency and long life. They are manufactured in gravity type, as well as in the more advanced forced air types that condition air. They, like the DeLuxe Front Ranks, have automatic humidity and temperature controls and can be equipped with gas or oil burners, automatic stokers or can be hand fired.

**MELLOW  
WARM AIR  
FURNACE**

#### Distributors and Dealers

Here is a line you should investigate. The Furnace season is at its peak right now so you better write for complete information.

**LIBERTY FOUNDRY CO.**

St. Louis, Mo.



## Dayton License Law

(Continued from page 21)

discretion keep a stenographic record of the testimony produced in such hearings. It may request legal advice from the City Law Department and adopt such procedure for its decorum and the dispatch of business at such hearings as it may regard advisable. The decision of the Board shall be final and no licensee whose license has been revoked shall be granted a new license until the expiration of six (6) months after the revocation aforesaid and after successful examination and payment of all fees as in the original instance. A revocation of license shall not entitle a licensee to a refund of any part of the license fee which he may have paid.

Sec. 713-19. The provisions of this ordinance shall not apply to public utilities, public institutions, public buildings, mercantile, commercial, or industrial plants which maintain departments for the installation and maintenance of warm air heating systems in or on the premises under expert supervision and in conformity with the laws of the State of Ohio and the ordinances of the City of Dayton relative to such installation and maintenance. If the Director of Service and Buildings finds any such warm air heating system to be installed, repaired, or altered contrary to the laws of the State of Ohio or ordinances of the City of Dayton, and the person responsible for such violation refuses to rectify the conditions complained of, he is authorized to refuse a permit for further work until the owner, director, or supervisor of said utility, institution, building, or plant requires the persons engaged in such work to pass examinations and procure licenses as provided by this ordinance. Provided

further, that this ordinance shall not apply to departments, branches, service units, or buildings of the Federal, State or municipal governments, nor to an individual installing, repairing, altering, cleaning, or adding to a warm air heating system in accord with the requirements of the laws of the State of Ohio and the ordinances of the City of Dayton for his own use on premises owned and occupied by him or being built by him for his personal occupancy. Such persons shall be granted a permit for such work by the Director of Service and Buildings upon making an affidavit that such work is not for hire and is in or on premises so used and occupied by or to be so used and occupied as aforesaid, and said permit shall be conditioned upon the approval of said work at its completion by said Department. Provided, also, that nothing herein contained shall be construed so as to permit the superintendent of building and loan associations of the State of Ohio, or any other public official that may be placed in charge of the liquidation of a building and loan association or other financial institution, his agent or employees, to install, repair, alter, clean, or add to a warm air heating system without the necessity of procuring such license and abiding by the requirements of this ordinance, and that nothing herein shall be construed as a waiver of the provisions of the Building Code or other ordinances applicable to the installation, repair, or maintenance of warm air heating systems or any other part of any building or structure.

Sec. 713-20. The Secretary of the Board of Examiners shall receive all examination fees and transfer same to the Department of Service and Buildings. He shall be under bond in such amount as the Board may require. All licenses required by this ordinance shall be issued by the Department of Service and Buildings and all money derived from examination fees or li-

cense fees herein provided for shall be paid into the City Treasury and be credited to the General Fund.

Sec. 713-21. It shall be unlawful after the passage of this ordinance for any architect, builder, contractor, corporation, firm, or individual to knowingly aid or abet any warm air heating contractor to do any work in violation of the provisions of this ordinance or to connive at its violation, or knowingly employ unlicensed warm air heating contractors for the performance of such work.

Sec. 713-22. Any person violating any provision of this ordinance shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be fined not less than five dollars (\$5.00) and not more than five hundred dollars (\$500.00) at the discretion of the court.

Section 2. In addition to the requirements and provisions contained in the Building Code of the City of Dayton, all warm air heating systems hereafter installed, altered, repaired, or added to in said City shall be thus installed, altered, repaired, or added to in strict accord with the requirements and provisions of The Standard Code regulating the installation of warm air heating systems approved and issued by authority of the National Warm Air Heating Association, Inc., The American Society of Heating and Ventilating Engineers, and the National Association of Sheet Metal Contractors, insofar as said requirements and provisions are not in conflict with said Building Code and as said codes now exist or may be amended hereafter.

Passed by the Commission June 19, 1935.

Signed June 19, 1935, by

J. E. BREIDENBACH,  
FRANK M. KREBS,  
Commissioners of the  
City of Dayton, Ohio.

Attest: Oscar F. Mauch, Clerk of the Commission.

## A 1935 SENSATION THE ACME HEATER "IT'S IN THE FINS"

**Every Warm Air Heating Contractor  
Should Have the Acme Story on File**

The ACME has proven a sensational success in schools, churches, theatres, factories, hangars and all types of public buildings.

Recommend it for your next job on the strength of these outstandingly superior features:

- Especially Adapted for Air Conditioning
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Please send me complete data on the ACME HEATER.

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The Mark  
of  
Quality

Seam  
Locked  
Every  
Few  
Inches

"Shur-  
Lock"  
Pipe

**BERGER BROTHERS CO.**  
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EAVES TROUGH  
GUTTER HANGERS  
CONDUCTOR FASTENERS  
MITRES  
END PIECES AND CAPS  
CONDUCTOR HEADS  
ORNAMENTAL STRAPS  
VENTILATORS, ETC.

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Buy from your jobber



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FOR ALL KNOWN USES



**In Industry and Construction**

Use sheets of recognized reputation and value. For roofing, siding, gutters, spouting, air conditioning systems, and general sheet metal work — Keystone Copper Steel gives maximum rust resistance.

Insist upon AMERICAN Black Sheets, Keystone Rust Resisting Copper Steel Sheets, Apollo Best Bloom Galvanized Sheets, Galvannealed Sheets, Heavy-Coated Galvanized Sheets, Formed Roofing and Siding Products, Tin Plates, Terne Plates, Black Plate, Etc.

Write us relative to your sheet steel requirements. This Company also manufactures U S S STAINLESS and Heat Resisting Steel Sheets and Light Plates for all purposes.

**AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.**

SUBSIDIARY of UNITED STATES STEEL CORPORATION



**WINNER  
MODEL**

Two Piece  
No. 800

**The AUER REGISTER CO.**

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CLEVELAND, OHIO

*Send for new Catalogue of Gravity  
and Forced Air Registers.*



For Air Conditioning

**CLASSIC Register (with Valve)**  
 No. 2010 for WALL, Slide Frame 5 1/2" Deep  
 No. 2020 for BASE, Slide Frame 1 3/4" Deep

**Sell Furnace Repairs and Make Money**

with Breuer's Ball Bearing  
**TORNADO**  
Furnace Cleaning Service



The TORNADO gets you into the basement where it is easy to sell repairs and new furnaces. And you make a profit on the cleaning job too. Hundreds of dealers say the TORNADO increased business beyond all expectations. We'll send you on request the name and statement of a dealer near you to prove our claims.

The TORNADO is the most powerful furnace cleaner built. Complete with 10 necessary attachments. Low price—easy payments—free trial. Approved by Anthracite Institute and Underwriters Lab. Write for complete information on a real money maker.

**BREUER ELECTRIC  
MFG. CO.**

865 Blackhawk Street, Chicago, Ill.




BREUER'S BALL BEARING  
**TORNADO**  
Furnace Vacuum Cleaner

# BRILLION

## WARM AIR FURNACES

# SATISFY!



They satisfy customers with their long-life and efficient and economical operation.

They satisfy dealers who sell them for they help develop many new customers. They have numerous outstanding sales features, they sell easily, they install easily and they yield a very satisfactory profit with each installation.

**No. 100 Series**

The 100 Series is a pipe furnace of two-piece radiator construction of the horseshoe type or two way travel. Radiator is convertible so that smoke pipe can be taken out at any convenient point. Casings can be furnished lined or unlined as an extra. Write or complete construction details.

Satisfy yourself that the Brillion Line can produce a profitable business for you. Write for complete catalogue NOW.

★

**BRILLION FURNACE COMPANY**  
BRILLION WISCONSIN

## Construction of Lead Dome

(Continued from page 15)

cleats on 12-inch centers folded into the top turn-over. The cleats were 16-ounce copper, secured to the roof near their upper ends above the lead sheets by copper nails, and the excess ends of the cleats were folded back over the nail heads to prevent damage to the lead from this source. Sheets were installed from the bottom up and as each succeeding sheet was placed it was loose locked to the one below and secured at the top in the same manner.

### Cleats and Caps

The roofing sheets were also secured to the battens by means of cleats nailed to the tops of the battens on 12-inch centers. Batten caps were installed in sections of 8 feet maximum length and loose locked to the roofing sheets along their sides. Caps were held in place at their upper ends by cleats, while at the lower end each batten simply overlapped the

one below by 3 or 4 inches, but was held down securely because it was locked to the roofing sheets along the sides.

### No Solder

No solder was used at any point in laying this lead roof, all seams being loose locked, and no nails were driven through the lead sheets, cleats being used exclusively to secure the lead. Thus the sheets are able to expand and contract freely in any direction with temperature changes without placing any strain on the metal. In turning the sheets up the sides of battens and vertical surfaces, a small space was left between the upstand of the sheets and the vertical surfaces to permit expansion. All loose locked joints were filled with a non-hardening compound further to insure against leakage. The maximum dimensions of the sheets were 4 feet by 2 feet except in a few cases where conditions required slightly larger sheets.

## Toxic Fume Exhaust

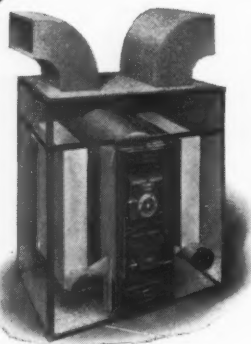
(Continued from page 20)

ties causing case drying, has the intent of this motto been jeopardized.

The design of the recommended system is shown in Fig. 2, the duct work shown two ways, noted 2A and 2B. The hood design for the particular case in mind was made as per Fig. 3.

### Costs

It is true that the installed cost will be greater with the duct work job, but this would soon be offset by the fuel savings in dollars and cents. The actual saving in safeguarding health cannot ordinarily be measured in concrete terms, but there is a saving there just the same. Some readers may counter with the argument that the propeller fan offers more air change for summer operation, but if the air change is not where it is needed, where is the gain?



## Watch More Furnace Dealers Investigate!

Look at this Modern Hearth Furnace with radically new Square Interior design! It's built of All Steel for gas as well as coal—NOT a convertible job; designed to use with all air conditioning systems, oil burners or automatic stokers. Furthermore, the TWO-FUEL FEATURE enables you to change from Coal to Gas, and Back Again by Simply Moving a Lever! Doesn't this make you want to know more about Modern Hearth?

We'd like to make a bet with American Artisan that this advertisement will break all records for creating interest among leading furnace dealers. WRITE TODAY!

## MODERN HEARTH FURNACES

THE THOMPSON MANUFACTURING COMPANY  
30TH. & LARIMER STS. SINCE 1878 DENVER, COLO.

## NATIONAL FURNACE REPAIR PARTS

Will "fit the job" where no other may. Try them on your next job.

Fast shipment—Quality castings—Priced right.

Send for Order Chart, Order Book and Catalog—Free.

NATIONAL FOUNDRY & FURNACE CO.  
STATION "B" . . . . . DAYTON, OHIO

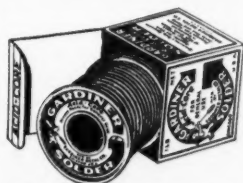
## YAEGER'S SOLDERING SALTS NOW BETTER THAN EVER BEFORE



The result of an improvement in formula coupled with installation of new machinery for grinding and blending, enable us to produce a flux of absolute uniformity in mix and more quickly soluble in water. Packed in: 1/2 lb., 1 lb., 5 lb. tins and in 25 lb. and 50 lb. drums.

Write Dept. "S"

ALEX. R. BENSON CO., Inc.  
HUDSON . . . . . NEW YORK

**IT REALLY COSTS LESS**

In 1, 5 and 20 lb. spools.

to use the highest quality solder possible in production and repair work. That is why manufacturers everywhere are specifying Gardiner Flux-Filled Solder.

Its uniform high quality and perfect flux save both time and material. Enables expert mechanics to do faster work and inexperienced help to do better work.

Made in various alloys and gauges in both Acid and Rosin Core.

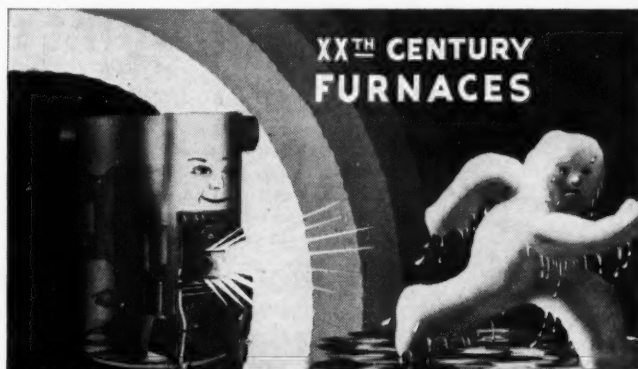
Because of modern production methods Gardiner Solder costs less than ordinary kinds.

Also makers of solid wire, bar, drop and pellet solders and babbitts.



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The Big Name in  
**HEATING**  
and **AIR**  
**CONDITIONING**  
is  
**MUELLER-MILWAUKEE**

**KEEP OLD MAN WINTER ON THE RUN**
**XX<sup>TH</sup> CENTURY HEATING & VENTILATING CO.**  
AKRON, OHIO
**BETTER RESULTS**
**WITH  
WALSH ASBESTOS  
FURNACE CEMENT**

Use Walsh Asbestos Furnace Cement for certain and satisfactory results on all installation and repair work.

**WALSH REFRACTORIES CORP.**  
Producers of High Grade Refractories  
for 50 years

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Walsh Asbestos Furnace Cement is furnished in 1, 2, 3, 5, 8 and 10 lb. cans; 25, 50, 100, 250, 500 lb. steel drums. We also manufacture Furnace Tile and Fire Brick.



**"OAKLAND"**  
and  
**"Z-RO-KING"**  
**FURNACES**

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FOUNDRY CO.**  
Belleville, Ill.

**IN STOCK**

**1,000,000 Pounds Furnace Repairs**  
**Pots Grates Feed Sections**  
**1,000,000 Pounds Stove Repairs**  
**Oil Stove Repair Parts & Wicks**

Fast, Accurate Shipments

**METZNER STOVE REPAIR COMPANY**

EST. 1880

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Kansas City, Mo.

**INCREASE YOUR PROFITS WITH THIS  
HOBART "Simplified" WELDER**

With this new Hobart 75 Ampere Arc Welder, designed especially for sheet metal shops, you can weld 24 gauge metal and heavier. A trial of this remarkable outfit will surprise you with the numerous cost saving jobs it will perform. It lets you arc weld work formerly considered impractical, at savings in time and labor. Write today for details, astonishing low price, 30 Days Trial Offer and booklet on "Many Profitable Uses of Simplified Arc Welding"—no obligation.



**HOBART BROS.**  
Box AR95 Troy, Ohio



★ WRITE TODAY FOR THIS VALUABLE BOOK



## Baffling Practices

(Continued from page 17)

lower firepot, and a 6-inch hole should be cut open for an observation window. The hole can be covered with window glass or non-inflammable cellophane. An extension light inside the casing will also be necessary to give proper illumination.

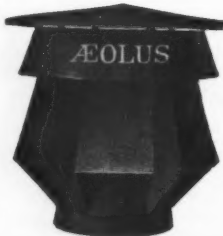
A small 1/2-inch hole should be cut near the window for the insertion of a wooden rod. To the end

of this rod, which is to be used for exploratory purposes, light pieces of thread or string should be attached. The rod should be inserted inside the casing, and the various parts of the casing should be probed for air flow conditions. The thread streamers on the end of the rod will give a visual index of the velocity and the direction of the air flow. It will be noted that in regions of turbulence, or in "dead zones," the streamers will not stay in a fixed position, but may whip about violently. In many cases the air stream may be

found to be flowing in a manner contrary to the flow of the main stream of air. Such indications are shown in Fig. 2.

Observations made in this manner, or with smoke fumes, will enable the designer to install the proper type and size of turning vane at the casing entry. The process of designing the vanes will be a cut-and-try process, but the results to be attained may be of sufficient importance to warrant extensive study by the manufacturer or installer of the furnace.

**Install**



**ÆOLUS**  
*Improved*  
**VENTILATORS**

**FOR** industrial buildings,  
schools, homes, theaters, etc.  
Made in 14 different metals.  
Constant ventilation—no noise  
—no upkeep.

**ÆOLUS DICKINSON**  
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## Strong, Lasting Joints

Write for  
Free Sample



Rubyfluid does not weaken metals by corrosion. Rubyfluid causes a smooth even flow of solder. As a result a Rubyfluid joint is strong, durable—and stays soldered. Available in flux, paste, acid or rosin core. A trial will convince you.

**RUBY CHEMICAL CO.**  
74 McDowell St. Columbus, Ohio

**Rubyfluid**

*Get All*

These Features  
When You  
Visit

**CHICAGO**



**Hotel AUDITORIUM**

A MICHIGAN AVENUE  
LOCATION

RIGHT AT THE  
EDGE of the LOOP

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ROOMS

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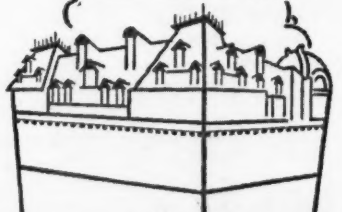
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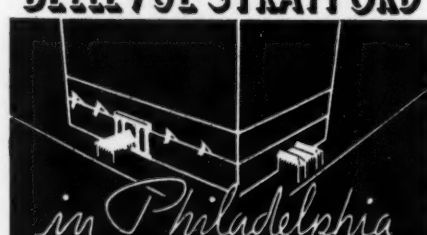
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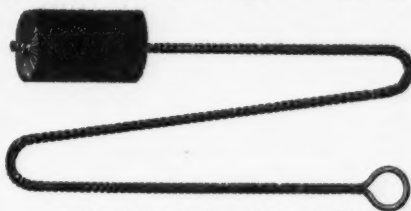
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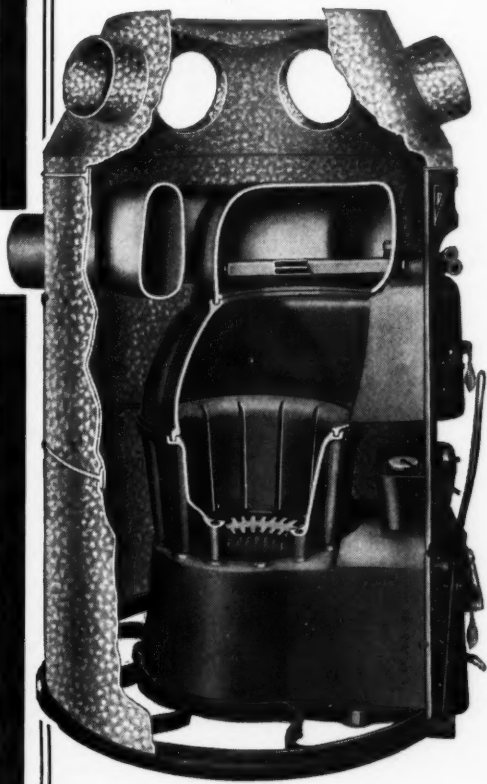


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SELF CLEANING RADIATOR
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- F H A—FINANCE PLAN

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Don't waste time and profits . . . there are still territories open . . . write at once.



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PARKER-KALON CORPORATION  
190 Varick Street New York



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